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# An Embedded Planning Tool for Tier Three Reading Instruction

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Reading, as a foundational skill for adolescents to have in order to compete in the labor market, has received great attention in the K-12 and postsecondary education research. The T-TIP (The Tier Three Instructional Planning Tool) is designed in alignment with the critical components of reading content and pedagogy for adolescents with reading difficulties in multi-tiered system of support. In the study, a single-subject AB multiple-baseline design across subjects will be utilized to investigate the effectiveness of T-TIP on teacher lesson planning, with a focus on corrective and elaborative feedback within Tier Three literacy instructional settings in secondary schools. Findings revealed that there is a functional relationship between T-TIP prompt and improving reading pedagogical behaviors (providing corrective and elaborative feedback) in intensive instruction. In addition, the social validity of the T-TIP demonstrated the acceptability and satisfaction in using T-TIP for teacher lesson planning and implementation of the instruction at Tier Three settings. The impact of the T-TIP on the frequency and sustainability of evidence-based reading instruction and teaching behaviors will be discussed along with the future research and recommendations.

# An Embedded Planning Tool for Tier Three Reading Instruction

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# An Embedded Planning Tool for Tier Three Reading Instruction

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# CHAPTER I

## INTRODUCTION

Reading, as a foundational skill for adolescents to have in order to compete in the labor market, has received great attention in the K-12 and postsecondary education research. To meet the academic and vocational needs of reading, under the No Child Left Behind Act of 2001 (NCLB, 2002), all students including students with disabilities, were expected to achieve reading proficiency by the year of 2014. However, the National Assessment of Educational Progress (NAEP) data signify a crisis in public schools, as 68% of fourth graders and 70% of eighth graders perform at or below the basic level in reading comprehension nationally (National Center for Education Statistics, 2011). Almost two-thirds of students, including students with disabilities, do not have "partial mastery of the knowledge of skills that are fundamental for proficient work at grade level" (NAEP, 2011). NAEP data also indicated a significant achievement gap between students with and without disabilities: 65% of 8th grade students with disabilities scored below the basic level in reading achievement, compared to 22% of their peers without disabilities. Similar results were obtained from 2009 Connecticut AYP assessments that 28.1% of 10th graders with disabilities scored in the lowest level in reading, compared to 5.4% of their peers without disabilities (Connecticut State Department of Education, 2009).

At the same time, researchers and policymakers alike have advocated for Response to Intervention (RtI) as an academic intervention to reduce the likelihood of failure among struggling students, including students with disabilities, by emphasizing student response or nonresponse to certain instructional decisions. The major theoretical basis for RtI derives from public health approaches to disease prevention that considers primary health needs through

prevention and then Tier Two and Tier Three intervention of support based on patients' initial needs or response to treatments (Vaughn, Wanzek & Fletcher, 2007).

Specifically, in Tier One, all students participate in effective reading instruction in general education classrooms, and each student's progress is monitored. Those whose performance is critically below the average level of performance of peers are designed to move to more intensified instruction (Tier Two level). Tier Three interventions are typically provided to those students who demonstrate minimal progress after being taught with high-quality, validated classroom instruction (Tier One) and secondary level intervention (Tier Two). Typically, these students are inadequately responding to whole- or small-group intervention and require more intensified individualized instruction (Fuchs & Fuchs, 2003). Tier Three instruction provides more intensified intervention and smaller group size than Tier One and Tier Two with usually 3 to 5 times per week and 1 to 5 students in each group.

Moving students with the greatest deficits directly to a well-conceptualized intensified instruction is necessary. As suggested by Fuchs and Fuchs (2010), students in middle and high school levels with severe reading deficit require interventions that directly target their reading needs, such as the shortfalls in both word recognition and language comprehension. Therefore, "practitioners need to consider placing severely discrepant students immediately in the most intensive level of the RTI framework" to remediate their reading deficits (p.26).

Given the theoretical framework, the major differences among Tier Three intervention and other tiers, as suggested in Mellard, McKnight, and Jordan (2010), rely on the group size and the intensity of the interventions. However, recent studies (e.g., Vaughn et al., 2010) cast doubt on the power of simply decreased group size and increased instructional intensity to improve academic outcomes for students with severe deficits, especially at the Tier Three level.

Improving teacher lesson planning and substantive changes to implement evidence-based literacy instruction faithfully are also highly needed in the Tier Three interventions.

In a study conducted by Vaughn and colleagues (2010), researchers conducted a year-long intervention with large-group, small-group, and school-wide intervention provided for seventh- and eighth-graders with disabilities. Based on sixth graders' response to the intensified intervention, results indicated closing the gap likely requires more than simply decreasing group size and increasing instructional intensity. Thus, evidence-based reading instruction, reducing class-size, and intensifying instruction so that it is delivered one-to-one may not necessarily boost student achievement. Other facts may need further consideration, particularly the interaction of other resources such as teacher knowledge and practice (Raudenbush, 2009).

Barnett, Denny, and Albin's (2009) found that providing professional development and increasing teacher knowledge toward evidence-based intervention have significant positive effects on student reading and writing in general. Especially, at the Tier Two level, group size was not the statistically significant predictor in student reading achievements and simply reducing the group size without other changes in intervention may be insufficient to improve student outcomes in older grades (Vaughn & Swanson, 2014). Instead, providing evidence-based literacy interventions as well as fidelity of implementation are significant keys to improving student academic achievement. For Tier Three teachers, moving towards defining interventions in terms of the critical components of evidence-based instruction known to be effective for struggling students is necessary in Tier Three framework.

**Evidence-Based Instruction**

Research meta-analyses (e.g., Swanson, 1999; Edmunds, 2009) of effective adolescent reading instruction document that positive outcomes have been achieved for adolescent

struggling readers when interventions are comprised of evidence-based content (What to Teach) and evidence-based pedagogy (How to Teach; Wilson, Faggella-Luby, & Wei, 2013). Choosing appropriate instructional materials, engaging student participation with sufficient technological support, as well as documenting the fidelity of teaching instruction, are proven to effective in previous Tier Three investigation (Swanson & Vaughn, 2010).

Among the variety of critical components of evidence-based instruction, reading pedagogy plays the critical role in shaping teaching behaviors, engaging students in instruction, as well as delivering instruction appropriately. The foundation of adolescent Tier Three reading instruction rests on providing intensive individualized instruction with frequent progress monitoring (e.g., Reschly, 2005). Built upon that foundation is providing high-quality explicit instruction with nine critical components in teaching pedagogy which significantly differentiated Tier Three instruction from others: (1) provide advanced organizers, (2) carefully sequence and segment instruction, (3) control task difficulty, (4) provide extensive teacher modeling, (5) provide extensive opportunities for questioning , (6) provide corrective and elaborative feedback, (7) encourage self-regulated learning, (8) provide multiple opportunities for repeated active practice using multiple modes of response, and (9) regularly conduct progress monitoring assessments (Swanson, 1999a, 1999b).

The nine pedagogical components are arranged to ensure a good teaching at the beginning, during, and after instruction. However, one of the pedagogical components in providing extensive opportunities for corrective and elaborative feedback is considered to be especially important in previous Tier Three research. Corrective and elaborative feedback refers to “any reaction of the teacher which clearly transforms, disapprovingly refers to, or demands improvement of the learner utterance” (Chaudron, 1977, p.31). Corrective and elaborative

feedback is an important aspect of every school day and plays a critical role in the teaching and learning process. The primary purpose of providing feedback to students are to reinforce student appropriate academic behavior, let student know how they are doing, where to improve, and extend their learning opportunities (Miller, 2002). Lyster and Ranta (1997) identified five types of corrective and elaborative feedback, including explicit correction, recasts, clarification requests, elicitation, and repetition of error. In particular, feedback types such as elicitation, clarification requests, and repetition of error create opportunities for students to actively engage in the feedback process than do feedback types of reformulate learner errors, such as recasts and explicit correction (Lyster & Ranta, 1997).

In addition, Konold, Miller, and Konold (2004) demonstrated three types of feedback that are available to help facilitate reading: (1) Three-Term contingency Trail feedback, the feedback regarding factual knowledge when answering reading comprehension questions; whereby, the teacher asks a question, student answers the question, and then the teacher provides the answer with the immediate and specific feedback, such as "well, we can find the answer from this paragraph,--"; (2) differentiated feedback, the feedback based on the type of response from students. With this type of feedback, teachers could reteach the content or provide additional practice at a later time; and (3) instructive feedback, which involves consistently adding supplemental information to students' responses. For example, the teacher expands information related to the instructional topic, presents materials that requires the same response, and/or gives novel information to supply the correct target response.

Struggling adolescent readers benefit from explicit instruction regarding providing corrective and elaborative feedback. Corrective and elaborative feedback positively influences the magnitude of treatment outcomes (Swanson, 1999b). The process of providing corrective

and elaborative feedback is considered to be an effective teaching strategy whereby signs of student confusion is acknowledged and immediately addressed with specific feedback. Corrective and elaborative feedback is an especially critical pedagogical component in Tier Three instruction. Swanson (1999a) clearly identified the high effect size of this pedagogical component in increasing the predictive treatment outcomes for students with learning disabilities. Leinhard (1981) also indicated that reading behaviors were significantly predicted ($R^2$ =.59) by certain teaching instruction (e.g., academic feedback) in improving student reading abilities and behaviors. As suggested, without sufficient and effective teacher feedback in the process, student learning and reading improvement are impeded.

Unfortunately, it is much easier for teachers to be absorbed in other teaching pedagogies, and subsequently, teachers may forget about the benefits of providing corrective and elaborative feedback to their struggling students. Especially, as observed in Hayhaynes and Jenkins (1986), the percentage of resource room time in which student received teacher feedback is less than 5% of the instructional time in self-contained settings. The majority of instructional time (58%) was spent on non-interaction interventions with no communications with teacher and students despite of the small group size provided in the settings (Hayhaynes et al., 1986). Typical reading instruction in Tier Three resource rooms also revealed that students with disabilities received little feedback and few explanations from their teachers, and only spent 25% of the time interacting with their teachers in reading.

Kea (1988) agreed with Hayhaynes and Jenkin (1986) and reported teachers of students with learning disabilities only provided 4% of their instructional time on feedback and that the most commonly used feedback was simple and positive general feedback (i.e. good job, well done). Additionally, the corrective and elaborative feedback was limited with students with

learning disabilities in resource classrooms and that explanatory feedback for correct responses was nonexistent (Kea, 1988). Similarly, Swanson and Vaughn (2010) report that the most commonly observed type of comprehension instruction in Tier Three reading instruction was reading-comprehension monitoring, mostly comprised of teachers asking questions after reading. However, little instructional time was reported from observations of teachers providing corrective, elaborative and specific feedback on student responses after questioning. Especially, the error treatment and feedback in the classroom is imprecise, inconsistent, and ambiguous (Swanson & Vaughn, 2010).

**Teacher Lesson Prompts/Interventions to address feedback**

Previous research (e.g., Herchell, Greco, Flicheck & McNeil, 2002; Konold, et al., 2004) has identified a number of general characteristics that enhance the quality of teacher feedback. Planned and specific feedback that is designed ahead of time to target student anticipated confusions is much more likely to influence student performance than haphazard and general feedback (Herchecll, et al., 2001). Planned feedback increases instructional efficiency and particularly benefits students with disabilities with learning and/or reading difficulties to assist them in understanding the correct and incorrect answers, the reasons behind errors, and preventing students from making similar errors in the future (Herchecll et al., 2002). Thus, teachers are encouraged to plan the corrective and elaborative feedback ahead of time before class and carefully planned teacher feedback provides this important information in a supportive manner (Konold, et al., 2004).

"Successful teachers are inevitably good planners and thinkers" (Gafoor & Farooque，2010, p.2). With evidence-based interventions in mind, planning the lesson as well as implementing the lesson faithfully is critical in Tier Three framework, especially for students

with reading/learning disabilities and struggling readers. Panasuk and Todd (2005) demonstrated that the written forms of lesson plan with an alignment of content, pedagogy, and instructional activities and feedback revealed a higher degree of lesson coherence. Written lesson plans especially helped new and inexperienced teachers organize text, materials, activities, and content in the instruction as well as practice and prepare for anticipated questions and corrective feedback based on student needs. A detailed written script also provides explicit planning on timing, key content, as well as activities and feedback to make the lesson well-organized and engage student with learning goals set forth in the lesson (Craft & Bland, 2004).

However, previous lesson planning studies (e.g., Keller , 2000; Panasuk,1999) described the general agreed-upon dilemma in teaching instruction with written lesson planning: (a) there is a common issue in lesson planning in that many teachers in the United States do not even prepare lesson plans; (b) experienced teachers do not design instruction ahead of time in a written form of lesson planning; (c) the lesson planning that most teacher designed are quite brief, vague, and lack of critical information; and most importantly (d) in the reading field, a literacy lesson planning model in Tier Three instruction is generally lacking at the secondary level.

Consequently, educators planning adolescent Tier Three literacy instruction face a dilemma. As few research studies in RTI target secondary school Tier Three literacy instruction, few models exist to help guide teachers' instructional planning. In addition, as written lesson planning is an overwhelming challenge in most secondary schools, helping teachers identify how to teach and prompting teachers to target specific teaching pedagogy in written forms of planning becomes an option. That is, instead of asking teachers to write a whole lesson plan, providing teachers with written planning prompts developed in alignment with evidence-based instruction

that specifically target the critical teaching pedagogy (providing corrective, extensive, and specific feedback) may be a way to reduce the difficulty of such a complex undertaking.

**The T-TIP Prompts**

To implement high quality tiered interventions, the Tier Three Instructional Planning (T-TIP) tool, a classroom planning prompt, was designed for use in secondary schools (Wilson, Faggella-Luby, & Wei, 2013). As Pianta and Hamre (2009) explain, classroom planning tools play an important role in an accountability framework because of the observation of teacher behavior. Thus, these tools are beneficial because (a) they directly measure evidence-based behaviors/instruction that impact student achievement, (b) hold teachers accountable to enacting those behaviors/instruction, and (c) they map onto research-based interventions that can be supported in instructional planning.

To function in these ways, classroom planning prompts, by necessity, must be well-aligned with and reflect instructional best-practices. Thus, a classroom planning prompt that has been developed in alignment with evidence-based instructional practices known to benefit adolescents with reading difficulties, can help teachers and administrators: (1) define and implement high quality Tier Three reading interventions, and (2) identify areas for ongoing professional development.

The T-TIP (**Appendix A**) is designed in alignment with the critical components of content and pedagogy for adolescents with reading difficulties. It consists of two forms: Form A–T-TIP: Content and Form B–T-TIP: Pedagogy. Each form includes three columns: (1) 'Component': the evidence-based components of content and pedagogy effective with adolescent struggling readers, (2) 'Example Activities': examples of ways educators can address these components in their instruction, and (3) 'Planning Suggestions': questions that direct educators

to consider critical aspects of instruction related to each of the components (Wilson, Faggella-Luby, & Wei, 2013).

As stated in the T-TIP, the planning tool for adolescent Tier Three reading instruction was designed in accordance with the evidence-based reading components (what to teach) and reading pedagogy (how to teach). In alignment with the critical pedagogical component of this study, the specific T-TIP prompt is designed to reduce the difficulty of planning Tier Three reading instruction for adolescents, and ensure that this instruction moves beyond the ineffective prescription. Regarding the pedagogy component with the close monitoring (providing feedback), four steps are proposed for the guidance of implementing the tool functionally and effectively (Wilson et al., 2013):

**Step 1: Select the pedagogy component (providing feedback) that facilitates achieving the goal(s) of the lesson.** The pedagogy components presented in Form B–T-TIP: a pedagogical structure for Tier Three instruction. For the purpose of the current study to address current gaps in the research around teachers' use of feedback prompts for struggling adolescent readers, the components of corrective and elaborative feedback, including operational definitions, examples, and non-examples, are provided to facilitate additional understanding.

**Step 2: For pedagogy components selected, choose example activities to include in the lesson plan.** The 'Example Activities' column helps educators think about ways of addressing each pedagogy component in their lesson. Certain activities may be more or less salient depending on the individual needs of the student or the location of a particular lesson within a unit.

**Step 3: For the selected pedagogy components, determine the critical instructional considerations that should be addressed in the lesson plan.** The 'Planning Questions' column

of Form B–T-TIP: Pedagogy helps educators focus their mental energy on critical instructional considerations related to explicit instruction. Teachers in this process may use self-questioning strategy to determine the important instructional activities to address selected pedagogy.

**Step 4: Implement high quality Tier Three instruction**. The T-TIP prompt facilitates instructional planning and helps educators expend their energy where it is needed most, for instruction and problem-solving with students.

By using the planning prompt created in alignment with the pedagogical component, educators are expected to reduce the complexity of instructional planning and develop high quality Tier Three reading instruction. By following this process, the T-TIP will assist educators in helping those most at-risk readers experience academic success.

The purpose of this study is to use a single-subject AB multiple-baseline design across subjects to investigate the effectiveness of T-TIP planning tool on teacher lesson planning, with a focus on corrective and elaborative feedback within Tier Three literacy instructional settings in secondary schools to answer the following questions: (a) Is there a specific functional relationship between teacher lesson planning with T-TIP prompt and teaching behaviors? and (b) Do participating educators consider targeted T-TIP lesson prompt as socially valid for increasing the use of specific reading pedagogy?

# CHAPTER II

# LITERATURE REVIEW

During the past 10 years, standard measures demonstrate that struggling adolescent readers generally have significant reading difficulties and are reading at an unacceptable low level. For example, recent reports of National Assessment of Educational Progress (NAEP, 2013) have revealed that approximately 8.7 million adolescents (fourth through twelfth graders) in U.S. whose chances for academic success are discouraging because they are unable to read and comprehend the materials in their textbooks. As reported in NAEP (2013), 32% of the U.S. fourth graders, 22% of eighth graders, and 27% of twelfth graders were reading below the basic levels. Almost 25% of adolescents are reading below their grade level expectations and their basic reading skills are still lacking (NCII, 2013). When adolescent struggling readers move to high schools, the reading accomplishment outcomes are even getting worse. Two thirds of twelfth graders are reading at less than proficient level on the National Assessment of Educational Progress and their preparations for the college and career readiness are far behind proficient readers (NAEP, 2013).

In particular, secondary school struggling readers, especially students with disabilities have encountered more reading difficulties than students without disabilities, whose reading problems are even worse. In 2013, the NAEP reported approximately 68% of fourth graders with disabilities and 64% of eighth graders with disabilities lack basic reading skills (NCII, 2013). Additionally, high school students with learning disabilities read on average 3.4 years below grade level in reading comprehension (Wagner et al., 2005). About one fourth of high school students with learning disabilities drop out of school annually and four-fifths were either

unemployed or working in a low-paying jobs in lacking of adequate literacy skills (Wagner et al., 2005).

As individuals with disabilities and struggling adolescent readers present varied reading problems, this systematic literature review will investigate the reading instruction in most intensive instruction for students with severe reading difficulties. The first step of further investigation of reading difficulties for students in secondary schools is essential to better make instructional and service delivery decisions over time.

**Typical Reading Models**

The Simple View of Reading model (Gough & Tunmer, 1986) proposed an interaction of two joint components (word recognition and listening comprehension) as the prediction of proficient reading (Hoover & Gough, 1990). An equation (R= WR x LC) has been generally proposed for adolescent readers ($4^{th}$ -$12^{th}$ grade) as an illustration of the relationship between the two components (WR and LC), in alignment with the reading comprehension (R) in the Simple View of Reading (Dreyer & Katz, 1992; Gough & Tunmer, 1986). As indicated in the model, the word recognition (WR) generally refers to the skills regarding word decoding, fluency, and phonological awareness; while listening comprehension (LC) relates to using context and word level information to interpret the discourse, such as literacy knowledge, background knowledge, and vocabulary (Hoover & Gough, 1990). Based on this model, when students move to secondary schools, the word recognition is much less emphasized; instead, the language comprehension plays a critical role in reading comprehension (Faggella-Luby & Graner, 2010).

As demonstrated in Gough & Tunmer (1986), a lack of either component is thought to result in a deficiency in specific reading comprehension and would result in challenges in the chronic reading development. Especially, adolescent readers are required to read more on

expository text using higher-order thinking skills (Faggella-Luby & Graner, 2010). For adolescent readers who are struggling in text comprehension, the instruction developed to address word recognition skills only may benefit fundamental reading fluency or word decoding and has a lower impact on comprehending a text, particularly to adolescents with learning disabilities (Edmonds et al., 2009). Vice versa, with students with dyslexia and students who are struggling in word recognition, it is important to provide word level and fluency instruction to increase the automaticity in reading and decoding the text.

Based on the Simple View of Reading Model, previous syntheses have identified critical intervention elements for effective teaching instruction for struggling adolescent readers across grade levels (e.g., Gersten, 2001; Edmonds, et al., 2009; Mastropieri et al., 1996; Swanson, 1999a, 1999b). It is critical to break down the reading comprehension into specific components when students have problems in reading, as well as to provide explicit strategy instruction and yield strong effects for comprehension for struggling adolescent readers and students with disabilities (Biancarosa & Snow, 2004; Gersten et al., 2001; National Reading Panel [NRP], 2000; RAND Reading Study Group, 2002; Swanson, 1999). Clarifying and implementing evidence-based reading components (what to teach) and reading pedagogy (how to teach) is a prerequisite in improving student skills in reading (Wilson, Faggella-Luby, & Wei, 2013).

**Reading Components**. Reading components (Table 1), also conceptualized as the core reading instruction, are comprised of evidence-based literacy content, including: (1) prior knowledge, (2) cognitive learning strategies, (3) text structure, (4) word study, (5) motivation, and (6) writing instruction (Faggella-Luby & Desher, 2008;Wilson, Faggella-Luby, & Wei, 2013). The importance of reading components in literacy instruction has been addressed in bodies of research. It is estimated that almost eight million students in the fourth through twelfth

Table 1

*Critical content components of adolescent reading instruction in Tier Three settings*

According to recent meta-analyses and research syntheses of adolescent reading instruction there are at least eight commonly agreed-upon critical components of adolescent reading instruction relevant in Tier-Three settings.

| | **Content: What to teach** |
|---|---|
| Prior Knowledge | Introducing, building, and/or clarifying necessary background knowledge for understanding the academic task. |
| Vocabulary and Concepts | Providing direct instruction on word meanings, word structure (morphology), and conceptual understanding. |
| Text Structure | Teaching students to recognize and use the organization of narrative and expository texts to support comprehension and expression. |
| Cognitive Strategies | Instructing techniques that help students develop and independently apply key behaviors and thinking skills that support comprehension. |
| Fluency | Teaching students how to orally read a text with appropriate rate, accuracy, and expression (prosody). |
| Decoding | Providing instruction on how to segment, blend, and decode multisyllabic words. |
| Motivation | Promoting engagement in learning, self-efficacy, and self-determination. |
| Writing Instruction | Teaching sentence construction skills, the writing process, and strategies to compose genre-specific text in order to enhance relevant reading abilities. |

**Selected References and Resources**

Edmunds, Vaughn, Wexler, Reutebuch, Cable, Tackett, & Schnakenberg (2009)

Faggella-Luby & Deshler (2008)

Graham & Hebert (2010)

Kamil, Borman, Dole, Kral, Salinger, & Torgeson (2008)

Wilson, Faggella-Luby, & Wei (2013)

*Cited from Wilson et al., (2013).

grades are not reading at their grade level (NAEP, 2011). This discrepancy, as Gesten, Fuchs, Williams and Baker (2001) suggested, is attributed to student lack of knowledge of critical reading components (e.g., text structure, background knowledge, and motivation). Faggella-Luby and Deshler (2008) also analyzed the critical role of reading comprehension components in improving adolescent reading achievements and advocates an effective literacy instruction that

should involve at least one of the six critical components (listed above) of a framework for reading comprehension instruction.

**Reading Pedagogy**. Reading pedagogy also known as How to Teach, is built upon the foundation of providing high-quality explicit instruction and a more complete pedagogical structure for helping adolescents close the gap in reading achievement (Archer & Hughes, 2011; Rosenshine, 1995). Based on a review of the literature (Swanson, 1999a, 1999b), there is broad consensus that the following eight critical components of reading pedagogy form a more complete pedagogical structure for helping adolescents with disabilities close the gap in reading achievement: (1) provide advanced organizers, (2) carefully sequence and segment instruction, breaking down a targeted skill into specific components and presenting information in small steps, (3) control task difficulty, ensuring high levels of student success by modifying the content of instruction to better match students' ability levels, (4) provide extensive teacher modeling, (5) provide extensive opportunities for questioning and feedback, (6) encourage self-regulated learning, (7) provide multiple opportunities for repeated active practice using multiple modes of response, and (8) regularly conduct progress monitoring assessments (Swanson, 1999a, 1999b; Wilson, Faggella-Luby, & Yan, 2013) (Table 2).

Considering the severe reading difficulties among adolescent struggling readers and the corresponding few supports from general education teachers in secondary settings, intensified literacy instruction based on individual needs may help remediate severe reading difficulties in adolescent readers. A report on adolescent literacy indicated that as many as 70% of secondary students require some form of reading remediation (Biancarosa & Snow, 2004). It also has been argued that a minimum of 2.5 million students require intensive academic literacy instruction (McMaster, Fuchs, Fuchs, & Compton, 2005; Wanzak & Vaughn, 2009). In particular, students

Table 2

*Critical pedagogy components of adolescent reading Instruction in Tier Three*

Based on the existing literature, we have selected eight frequently-cited components of explicit instruction effective for use with adolescent struggling readers and which facilitate teaching the eight content components of Tier-Three reading instruction.

| | **Pedagogy: How to teach** |
|---|---|
| Provide Advance Organizers | Engaging in activities that help students organize and integrate new information with prior knowledge. |
| Carefully Sequence and Segment Instruction | Breaking down a targeted skill into specific components and presenting information in small steps. |
| Control Task Difficulty | Targeting instruction at a student's ability level and providing guided instruction. |
| Provide Extensive Modeling | Using demonstration and think-alouds to explicitly model key learning behaviors and thinking skills. |
| Provide Opportunities for Questioning and Feedback | Providing many opportunities for students to respond and receive corrective feedback. |
| Encourage Self-Regulated Learning | Encouraging students to be active partners in the learning process by self-monitoring and self-evaluating their performance. |
| Provide Opportunities for Repeated Practice | Affording students multiple opportunities to practice taught skills in different contexts, such as through speaking, listening, and writing. |
| Regularly Conduct Progress Monitoring Assessments | Conducting brief assessments of key aspects of reading ability and making instructional adjustments based on that data to ensure adequate response to instruction. |

**Selected References and Resources**

Archer & Hughes (2011)

Faggella-Luby & Deshler (2008)

Mastropieri, Scruggs, & Graetz (2003)

Swanson (1999)

Wilson, Faggella-Luby, & Wei, (2013)

*Cited from Wilson et al., (2013)

with disabilities from grade 4 and above who are identified with severe reading difficulties and performing constantly below the grade level expectations may need immediate remediation with intensive and individualized instruction, such as Tier Three instruction (Denton, 2012; Vaughn, Denton, & Fletcher, 2010). Given the varied reading difficulties among struggling adolescent readers and students with disabilities, intensified reading instruction as well as providing

evidence-based intervention in Tier Three settings is critical and should be emphasized in research studies (Vaught & Fletcher, 2012).

**Tier Three Instruction**

Tier three intervention is generally conceptualized as the instruction provided to those students who demonstrate minimal progress after being taught with high-quality, validated classroom instruction (Tier One) and secondary level intervention (Tier Two), which typically are considered to be inadequately responding to whole- or small-group intervention and involves more intensified individualized instruction (Fuchs & Fuchs, 2003).

Discussion of Tier Three intervention (Bradley, Danielson, & Doolittle, 2005; Cavanaugh, Kim, Wanzak, & Vaughn, 2004; Wanzak & Vaugh, 2010) predominately focus on intensified instruction (e.g., group size, instructional delivery), duration (number of sessions/weeks of intervention), and special education teachers as the primary interventionists.

*Intensified Instruction*. Mellard (2009) suggests that the intensity of instruction generally involves distinct variables, including instructional group size and instructional delivery. Students with the most severe needs in reading require more of their instruction delivered individually or in small groups. Until now, there is still no commonly agreed on group size for tertiary instruction. Many practitioners and researchers agreed that Tier Three instruction should be delivered one-on-one to students with severe reading problems (Barnett, Denny, & Albin, 2009; Slavin Lake, Davis, &Madden, 2009; Torgesen, 2001). As argued in Torgesen (2001), one-on-one instruction increases student opportunities to practice skills and receive feedback from teachers, focuses on prioritized skills and provides more specified remediation program for student particular needs. However, one-on-one tertiary instruction is expensive and requires a complexity of scheduling, especially in high schools. One-on-one instruction also may require a

change in resource allocation within schools by increasing the number of personnel and space (Mellard, McKnight, & Jordan, 2010).

Bradley, Danielson and Doolittle (2005) argued that intensified Tier Three interventions should use small instructional groups and more time spent in intervention for students with severe reading difficulties or students with learning/reading disabilities. There is also compelling research indicating that the effect size of the reading outcomes regarding the instruction provided to 3-5 students in small groups is as effective as the instruction provided on a 1 to 1 basis, even for most at-risk students (Elbaum, Vaughn, Hughes, & Moody, 2000; Harn, Linan-Thompson, & Roberts, 2008), therefore, instructors could try the group size of 2 to 5 and intensify the instruction before allocating students to 1-to-1 instruction based on student reading performances (Fuchs, Fuchs, Mathes, & Simmons, 1997). Mellard, McKnight, & Jordan (2010) agreed that when highly qualified teachers rigorously implemented a well-designed intervention, the academic benefit to students is the same, whether the group size is individualized or in a size of 2 to 5 students.

Considering the feasibility in schools, it might be impossible to implement the instruction individually, especially, if schools have many students with disabilities and struggling in reading and learning. Some high schools have this issue in particular when students with disabilities need more intensified instruction and the schedule of instruction is conflicted with the existing school schedule. Therefore, the group size of the instruction should be determined based on the both consideration of student needs and school reality.

*Duration.* Another way to increase time or intensity in an intervention is to increase the sessions or hours of instruction (duration) a student spends in intervention over the number of days (e.g., 2 hours per day for 10 weeks vs. 1 hour per day for 10 weeks). Although the effects of

this type of intervention intensity have not been studied specifically, most interventions occur for between 20 and 50 minutes per day with 10 weeks or more (Wanzak & Vaughn, 2008). Gersten et al., (2008) recommended that Tier Three instruction should be delivered in "multiple and extended instructional sessions daily" (p.10). Denton (2012) also proposed being more flexible that Tier Three instruction is suggested to implement based on students' needs and the level of intensity that the intervention is required.

*Interventionist*. Whether or not an interventionist delivers Tier Three reading instruction plays a critical role in instructional implementation. Raudenbush (2009) argues "without knowing the other resources required making better interactions occur (e.g., teacher knowledge)" (p.197) and fidelity of implementation, the reducing group size and intensifying duration of instruction itself does not reliably increase student achievement in any particular setting (Mellard et al., 2010). Rowan, Correnti, & Miller (2002) agreed that the interventionist knowledge and skills can make a significant difference in student outcomes and affect the intensity of that instruction.

As demonstrated in Jenkins et al., (2013), significant differences between the instructional personnel that taught in Tier Two and Tier Three were revealed in repeated measures ANOVAs, where special education teachers (84%) were significantly more often in delivering tertiary instruction, while reading teachers and paraprofessionals were named significantly more often in Tier Two instruction. Gersten et al., (2008) also recommended that Tier Three literacy instruction should be implemented by highly-trained and well-qualified teachers, as high levels of expertise and fidelity of instruction is highly expected in Tier Three instructors (Wanzek & Vaughn, 2010). When students with disabilities have demonstrated inadequate progress, teachers might be able to rule out other variables and analyze the reasons

behind it. Additionally, providing effective, high-quality, and intensified interventions to those students with disabilities who have suffered long time in reading difficulties is not an easy task, instead, it places large demands on teachers' knowledge, skills, fidelity of implementation, as well as the capacity to make quick instructional decisions on struggling readers (Denton, 2012).

Previous reviews and meta-analysis have revealed large effects of reading interventions provided in the early literacy remediation in Tier Three instruction. However, although the reading difficulties of students in grade 4 -12 are more challenging than in early grades, the effects of Tier Three reading instruction in upper elementary and secondary schools is still lacking and unknown (Denton, 2012; Torgesen, 2004; Wanzak, Wexler, Vaughn, & Ciullo, 2010).

Given few studies have yet been designed to investigate the effectiveness of reading instruction at Tier Three instruction in upper elementary and secondary schools, despite improved knowledge about effective reading instruction in the other Tiers (Tier One and Tier Two), much less is known regarding effective intervention and the pedagogy of reading instruction in tertiary classrooms. The need for additional knowledge on literacy instruction for struggling adolescent readers and students with disabilities at Tier Three secondary classrooms is highly needed. This study will fill in the gaps of the investigation of Tier Three literacy instruction for students with disabilities as well as struggling adolescent readers by systematically reviewing on specific reading instruction (word recognition vs. language comprehension), and the relationship between student reading outcomes and teacher teaching pedagogy with treatment integrity.

**Purpose of the Literature Review**

To better understand the research on Tier Three literacy instruction, the purpose of this literature review is to fill in the gap in Tier Three literacy instruction for students with disabilities through addressing the following three research questions:

(a) To what extent does the research address general Tier Three literacy instruction in upper elementary and secondary schools?

(b) How does literacy intervention research address reading content toward Tier Three instruction for students with reading difficulties?

(c) How does literacy intervention research address reading pedagogy toward Tier Three instruction for students with reading difficulties?

To answer these questions, a systematic literature review was conducted to determine the outcomes of Tier Three literacy instruction and its relationship with instruction implementation. The literature review was extended to include struggling readers and students with disabilities from 4$^{th}$ to 12$^{th}$ grade for two reasons: (1) few research articles were found for students with learning disabilities in receiving Tier Three instruction; and (2) only two studies were found specifically to investigate the effectiveness of Tier Three literacy instruction for students in high schools. This study will also extend the previous research findings and make contributions to our knowledge of Tier Three instruction implemented for at-risk adolescent readers.

## Method

### Search Process

A multi-phase process was used to identify articles for inclusion in this review. The process included (a) a systematic search of electronic database, (b) an extensive search of all included articles' reference lists, and (c) a hand search from journals.

**Electronic search**. For this literature review, a computer search of ERIC, PsycInFO, and other Academic Search Premier was conducted to locate the studies from 1980 to 2014. Descriptors (e.g., *reading instruction, tier three interventions, tertiary intervention, intensifying/remedial instruction, at-risk readers, or instructional delivery*) were used to capture the possible number of articles, which yielded 370 articles in total. Studies were selected if they met all of the following criteria: (a) only included peer reviewed articles; (b) participants were struggling readers, including students with disabilities, and students with reading or learning difficulties; (c) participants were from 4$^{th}$ through 12$^{th}$ grade (age 8-21); (d) studies were implemented in Tier Three settings or self-contained classrooms as determined by a typical small settings with fewer number of students (Harn, Linan-Thompson, and Roberts, 2008); (e) the study should be reading related, such as reading programs, reading behaviors, reading instruction, reading components, reading pedagogy, or fidelity of reading implementation; and (f) the language was English.

Considering the embedded characteristics of Tier Three literacy instructions, information toward three criteria was collected: the intensity of instruction (group size ranged from1-5 and 30-50 minutes per instruction), duration (3-5 times per week, 10 weeks or more) and interventionist (special education teachers) of the study. Given the limited research in Tier Three reading instruction, very few studies could meet all three criteria. To extend the literature review, any studies that met two of three criteria were included in the review. After removing duplicates, this search process resulted in six articles for full coding.

**Reference Search**. In order to ensure a comprehensive literature review, a comprehensive ancestral search was conducted from the reference list of the six articles that were generated from the full article review. Each citation in the reference lists was located that

included the key words in the title or abstract (intensifying instruction, reading component, or reading pedagogy) in the abstract review. A total of 48 abstracts were reviewed in this process. Seven additional articles were identified and proceeded to the next full article review based on Tier Three searching criteria. After the full article review, these 7 articles met the full criteria and were retained for inclusion in this review. In total, we reviewed 60 unique abstracts, passed 48 abstracts to full coding, and retained 13 articles in the literature review.

**Hand Search.** A hand search of journals in the field was also conducted to capture the possible articles in this topic. To assure the coverage, four major journals regarding reading interventions and RTI that were published from 2004 to 2014 were reviewed (*Exceptional Children, Journal of Educational Psychology, Journal of Learning Disabilities, Journal of Special Education).* Three additional studies were located in the process of hand search. Thus, a total of 16 articles meet the criteria for this final literature review.

**Effect Size Calculation**

The effect size, *d*, was calculated as the difference between the mean posttest score of the participants in the intervention condition minus the mean posttest score of the participants in the comparison condition divided by the pooled standard deviation (Bryant & Wortman,1984). For this literature review, we used Cohen (1988)'s standard: effect sizes can be interpreted as $d = .20$ is small, $d = .50$ is medium, and $d = .80$ is a large effect size. The effect size calculation was only used for those studies with experimental design or those who have already reported effect size in the primary research study. For studies lacking appropriate information on effect sizes, data were summarized using findings from statistical analyses or descriptive statistics (Edmonds et al., 2009). In total, approximately six studies reported effect size and ten studies did not.

## Results

A total of 16 articles with a range of study designs are presented in this literature review. Among these articles, eleven targeted Tier Three instructions at secondary schools and another five articles focused on Tier Three literacy instruction in grades four and five. Results are generally summarized into three parts. First, an overview of the studies of Tier Three instruction in upper elementary and secondary levels is provided, including study design, sample characteristics and settings, intervention implementation, data analysis, and outcomes (Table 3). Second, describe studies of differentiated reading interventions at Tier Three settings in overall adolescent reading components, such as the word recognition, language comprehension, and comprehension, and comprehensive reading programs (Table 4). Finally, the specific reading pedagogy and fidelity of implementation described in Tier Three research studies is recorded (Table 5). The findings from the systematic literature review are synthesized and discussed. Effect sizes for reading outcomes are provided if the information is available in the studies.

### Studies of Overall Tier Three Instructions

A total of sixteen studies were included as examples of Tier Three instruction. Publication dates ranged from 1980 to 2014. Among these studies, 31% involved students from $4^{h}$ to $5^{th}$ grade (N=5), 56% involved students from $6^{th}$ to $8^{th}$ grade (n= 9), and 13% of studies (n=2) examined the Tier Three intervention in Grade 9 through 12 (Giess, Rivers, Kennedy, & Lombardino, 2012; Graham, Pegg,& Alder, 2007). The distribution of the Tier Three literacy research is detailed in Table 3.

Table 3

*Studies of Tier Three instructions (Samples, Settings, Design, Measurements, and Data Analysis)*

| Studies | Sample Characteristics and settings | Grade | Intervention Design and Implementation | Independent Variables (IV) and Dependent Variables (DV) | Design | Measurements | Data Analysis |
|---|---|---|---|---|---|---|---|
| Allor, Mathes, Roberts, Cheatham, & Otaiba (2014) | Students with disabilities (Treatment N= 76; Control N=65) from elementary schools<br><br>Special education teachers (N=6) | include 4 | Group size: 1-4<br><br>Intensity: 40-50 minutes daily<br><br>Duration: longitudinal<br><br>Interventionist: special education teachers | T: Early Intervention in Reading<br>C: instruction typically provided by the district<br>DV: student reading achievement | Randomized quasi-experimental design | Prestes and annual measures<br>The Comprehensive Test of Phonological Processing (CTOPP)<br>The Expressive Vocabulary Test (EVT)<br>Peabody Picture Vocabulary Test-Ill (PPVTIII)<br>Test of Word Reading Efficiency (TOWRE)<br>The Woodcock Language Proficiency Battery - Revised (WLPB-R)<br>CBM | Chi-square<br><br>HLM<br><br>effect size |
| Bentum, & Aaron (2003) | Students with LD (N1=230; N2=164, total= 394) from grade 1-7<br><br>Teachers (N=27)<br><br>Resource room | include 6-7 | Group size: 1-5<br><br>Intensity: 5- 15 hours per week<br><br>Duration: 3 years<br><br>Interventionist: Special education teachers | IV: Typical Reading instruction without specific reading programs embedded<br><br>DV: Student reading achievements | Mixed Method: Qualitative (teacher interview)<br><br>Quantitative (student academic achievements) | the Wide-Range Achievement Test (WRAT; Jastak & Wilkinson, 1984) or Wechsler Individual Achievement Test (WIAT, Wechsler, 1992) the WISC-R, WISC-III, or the Kaufman Brief Intelligence Test (K-BIT; Kaufman & Kaufman, 1990) and two achievement tests (WRAT or WIAT). | Descriptive Statistics<br><br>Inferential Statistics with t-test and ANOVA |
| Gabor,2010 | Students with Dyslexia (N=12) from ages of 10.44 years to 15.79.<br><br>In international school setting | Age: 10-15 | Group size: 2-3<br>Intensity: 3 times per week, 45 minutes per day<br>Duration: 8 months<br>Interventionist: | IV:<br>Teaching Reading Through Spelling (TRTS): a synthetic phonics-based APSL (alphabetic, phonic, syllabic, linguistic) | Quasi-Experimental | Schonell Word Reading<br>Schonell Spelling | Descriptive Statistics |

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| | | | special education teachers | programme.<br>DV: Student reading achievements | | | |
| Giess, Rivers, Kennedy, & Lombardino, (2012) | Students (N= 9) from 9th to 11th grade | 9-11 | Group size: Varied<br><br>Intensity: daily basis<br><br>Duration: a year<br><br>Interventionist: resource room teachers | IV: reading programs (Orton-Gillingham based reading instruction system, the Wilson Reading System (Wilson, 1996) the Barton Reading and Spelling System (BRSS; Barton 2000)<br>DV: Student reading achievements | Quasi-Experimental with non-random control group<br>Direct Observation | WJ III Test of Achievement, The Test of Word Reading Efficiency (TOWRE), and Barton Student Screening | Descriptive Statistics<br><br>Inter-rater Reliability (88%)<br><br>Effect size |
| Graham et al., 2007 | 42 middle school students with learning difficulties | 6-8 | Group size: 2<br>Intensity: 30 minutes small-group lessons each week<br>Duration: 26 weeks<br>Interventionist: special education teachers | T:QuickSmart Instructional Program<br><br>C: comparative data for the reading intervention<br><br>DV: the effectiveness of the intervention | Group Experimental | Progressive Achievement Tests (PAT)<br><br>Cognitive Aptitude Assessment System (CAAS) | Descriptive statistics<br><br>Paired sample t tests |
| Graham, Pegg,& Alder, 2007 | 47 high school students with learning difficulties | 9-12 | Group size: 2<br>Intensity: Three 30 minutes sessions per week<br>Duration: 32 weeks<br>Interventionist: teacher aids | IV: QuickSmart Instructional Program<br><br>DV: Student reading achievements | Quasi-Experimental | Cognitive Aptitude Assessment System (CAAS)<br><br>Progressive Achievement Tests (PAT) | Descriptive Statistics<br><br>One-way ANOVA |
| HayHaynes & Jenkins (1986) | Students with disabilities (N= 117, including 105 students with | 4-5 | Group size:1-6<br>Intensity: some daily, others for 3 days per week; on | Reading instruction in resource rooms and examine the relationship between | Direct Observation Study | The Slosson Oral Reading Test (SQRT) (Slosson, 1963), and the Wide Range Achievement Test (WRAT), Level I, reading | Inter-rater reliability (.91)<br>Descriptive |

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| | LD)<br>from grade 4-6<br><br>Special Ed resource rooms | | average, 46 min per day or 232 min per week.<br>Duration: 3 months<br>Interventionist: resource room teachers | classroom process and student reading achievement | | subtest.<br><br>SOBR for observation | Statistics<br><br>Inferential Statistics: t-test Multiple linear regression on student academic achievements |
| Jenkins, Schiller, Blackorby, et al., (2013) | Teachers (N=62) in elementary schools | Include 4-5 | Group size: 30% on range of 1:2, the averaged group size ranged from 1 to 6 for tier 3; 82% of the respondents reported 4 or fewer<br><br>Intensity: 4.7 days per week for tier 3.<br><br>Duration: Tier 3 ranged from 25 to 80 min. 75% reported 30 to 50 min per day.<br><br>Interventionist: special education teachers | Tier 3 reading implementation at elementary schools | Qualitative Study (Survey Interview) | Research-designed survey | Descriptive Statistics<br>Inferential Statistics: ANOVAS |
| Mercer et al., 2000 | Students with disabilities (N=49) from grade 6-8 | 6-8 | Group size: 1:1<br><br>Intensity: 5-6 minutes per day, five days a week | IV: Great Leaps Program<br><br>DV: potential changes | Experimental pre/posttest three-group design (groups were differentiated by | the Wechsler Intelligence Scale Children-Revised (WISC-R)<br><br>Woodcock-Johnson Psycho-Educational Battery-Revised (WJPB) | Descriptive Statistics<br><br>Dependent t-test |

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| | | | Duration: 6- 25 months based on student availability<br><br>Interventionist: Special education teachers; Teacher assistants | in reading rate per minute on graded passages | length of intervention) | Beery Development Test of Visual-Motor Integration<br><br>Bender Visual Motor Gestalt Test<br><br>The Cognitive Ability Subtests of WJPB | effect size |
| Pyle, & Vaughn,. (2012). | Students (N= 210) from grade 6-8 | 6-8 | Group size: 5 students per group in tier 3; In tier 4, the group size is 1:2 or 1:4<br><br>Intensity: daily, 50 minutes per day<br><br>Duration: a year-long<br><br>Interventionist: special education teachers | IV: Individualized Instructional approach or a Standardized protocol Instructional approach<br><br>DV: Student reading achievements | Group Experimental | CBM<br>Texas Assessment of Knowledge and Skills (TAKS)<br><br>AIMSweb Reading Maze<br>the Passage Fluency<br>Woodcock<br>Johnson III Letter-Word Identification assessment or the GRADE Comprehension Composite assessment<br>at posttest. | Descriptive Statistics<br><br>effect size |
| Sorrells, & Linan-Thompson, (2005) | Special Ed resource room Teachers (N=4) from middle schools | 6-8 | Group size: varied, one out of four teachers provided 1:1 instruction.<br><br>Intensity: 50-90 min per day; 3 or 4 days per week<br><br>Duration: NR | IV: the use of evidence-based reading instruction (decoding, fluency, vocabulary, and reading comprehension) and effective instructional components (advance organizer, practice, corrective feedback, grouping, and reduction of task difficulty) | Case Study | Direct Observation on how special education teachers deliver their typical literacy instruction at natural settings.<br><br>Interviews: oral questions, topics related to the variables of interest in the research questions. | Descriptive Statistics: % Qualitative data analysis was employed to obtain the reality of reading instruction in resource rooms |

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| | | | Interventionist: special education teachers | DV: Teachers' implementation of reading interventions and reading pedagogy | | | |
| Spencer and Manis (2010) | 60 students with disabilities. (52 LD) from grade 6-8<br><br>Self-contained special education classrooms | 6-8 | Group size: 1:1<br><br>Intensity: 4 times per week, 10 minutes per time<br><br>Duration: 6–7 months<br><br>Interventionist: special education teachers | T: Fluency training in letter-sounds, phrases, word decoding, and text using repeated readings<br><br>C: Skills for School Success<br><br>DV: student reading achievements | Group Experimental | WRMT Passage Comp.<br>GORT-III Fluency<br>WRMT Word ID WRMT Word Attack<br>TOWRE PDE<br>TOWRE SWE | Descriptive Statistics<br>Inferential Statistics: correlational analysis<br>Post hoc Paired sample t-test<br><br>Effect Size |
| Swanson, E. A., & Vaughn, S. (2010) | Students with disabilities (N=32, 18 students with LD) from grade 4-5<br><br>Special Ed Teachers (N=10)<br><br>Special Ed Resource Rooms | 4-5 | Group size: Varied<br><br>Individualized instruction (27.3%), independent (19.82%), small group (4.57%), and paring (2.56%).<br><br>Intensity: daily basis<br><br>Duration: NR | Components of effective reading instruction that teacher implemented in the resource rooms.<br><br>Student academic progress<br><br>Systematically observe components of effective reading instruction, text reading, grouping strategies, and student academic outcomes | Direct Observation | Instructional Content Emphasis-Revised (ICER-R), Woodcock Johnson III, DIBELS ORF | Inter-rater Reliability<br><br>Descriptive Statistics<br><br>Inferential Statistics: Paired Sample t-test, Bonferroni adjustment |

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| Torgesen, Alexander, Wagner, et al., (2001) | Students with learning disabilities (N=60) from grade 3-5 | 4-5 | Group size: 1:1<br><br>Intensity: daily with two 50-min of instruction per day<br><br>Duration: 8 weeks plus 2 years follow-up period<br>Interventionist: special education teachers | IV: the Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (Lindamood & Lindamood, 1998)<br>or<br>an embedded phonics approach developed by the researchers<br><br>DV: Student reading achievements | Group Experimental | CTOPP<br>The Lindamood Auditory Conceptualization Test,<br>Woodcock Reading Mastery Test-Revised<br>TOWRE<br>The Gray Oral Reading Test<br>Kaufman Test of Educational Achievement<br>Woodcock-Johnson Psychoeducational battery<br>IOWA<br>Clinical Evaluation of Language Fundamentals | Descriptive Statistics<br><br>Inferential Statistics: ANOVA |
| Vaughn, Moody, & Schumm (1998) | Special Ed Teachers (N=14) in grade 4-5 Resource Rooms | 4-5 | Group size: Varied based on different teachers<br><br>Intensity: 60-90 minutes<br><br>Duration: a year<br><br>Interventionist: special education teachers | Teaching behaviors and reading instruction in resource rooms | Direct Observation | Observations ( adopted version of the Classroom Climate Scale (McIntosh et al., 1993)<br><br>Teacher self-report | Inter-rater Reliability<br><br>Qualitative |
| Vaughn, Wexler, Roberts, et al., (2011) | Students (N=182) from grade 6-8<br><br>Special Education tier 3 | 6-8 | Group size: 4-5 students<br><br>Intensity: 50 min daily for 160 lessons<br><br>Duration: a year long<br><br>Interventionist: special educator | IV: Individualized Instructional approach or a Standardized protocol Instructional approach<br><br>DV: Student reading achievements | Group Experimental | WJ-III tests for decoding and spelling; Word Reading Efficiency (TOWRE) for fluency; the Texas Assessment of Knowledge and Skills (TAKS) for reading comprehension. | Inferential Statistics: Latent Variable Growth Modeling (LGM)<br><br>Effect size |

Table 4

*Studies of Evidence-based Reading Components at Tier Three Settings*

| Studies | Total Amount of Reading Instruction | Reading Components | Reading Programs Reported | Word Recognition | Language Comprehension |
|---|---|---|---|---|---|
| Allor, Mathes, Roberts, Cheatham, & Otaiba (2014) | 40-50 minutes daily instruction for 1-4 academic year | phonological awareness<br>word recognition<br>Fluency<br>Comprehension | Early Intervention in Reading | Students demonstrated significant word reading and fluency gains. | The reading comprehension test revealed statistically significantly differences on reading comprehension of treatment groups (d=0.69). |
| Bentum, & Aaron (2003) | NR | Phonics<br>Comprehension<br>Spelling | Phonics-Based Strategies: Hermann Phonics and the Orton-Gillingham method for LDs (18%)<br><br>"Eclectic strategies" for remedial instruction: addressing whole language and phonics-based approaches (82%) | For *word recognition*, the intimal mean score was 78, after resource room instruction for years, the post-evaluation score was 77.3. | The initial average score of *reading comprehension* was 87.5, after 3 years of resource room instruction, the post evaluation score was 85.2<br><br>The pretest mean score of *spelling* was 78.3, then posteveluation was 76.3, the decreasing was significant. |
| Gabor,2010 | NR | Reading Comprehension<br>Spelling/Writing | Teaching Reading Through Spelling (TRTS): a synthetic phonics-based APSL (alphabetic, phonic, syllabic, linguistic) programme. | NR | On average, students have made the improvement with 1.79 years of reading, and 1.33 years of spelling after 8 months of instruction. |
| Giess, Rivers, Kennedy, & Lombardino, (2012) | NR | Phonological awareness<br>Sound Awareness<br>Word recognition<br>Spelling | Supplemental reading programs for phonic-based trainning : Orton-Gillingham based reading instruction system,<br><br>the Wilson Reading System (Wilson, 1996)<br><br>the Barton Reading and Spelling System (BRSS; Barton 2000) | Phonological awareness (d=.22) small gains in posttest<br><br>Sound Awareness (d=.54), medium gains in posttest.<br><br>Word recognition (d=1.06), large gains in posttest | Spelling (d=.53) for improvement in pre/posttest), with medium effects. |
| Graham et al., 2007 | NR | Word Recognition<br>Fluency<br>Reading Comprehension | QuickSmart Instructional Program | NR | Paired sample *t* tests indicated that the *QuickSmart* students' posttest scores were significantly higher than their pretest standardized scores on measures of comprehension.<br><br>The finding supported that improving struggling readers' fundamental reading |

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| | | | | | skills, which is addressed in QuickSmart would also benefit more higher-order thinking skills, such as reading comprehension. |
| Graham, Pegg,& Alder, 2007 | NR | word recognition<br>vocabulary<br>fluent reading<br>comprehension | QuickSmart Instructional Program | The speed and accuracy has been improved after implementation of QuickSmart on word recognition (1.3 per sec on pretest vs. 0.63 per sec on posttest). | QuickSmart Intervention has been effective in improving low-achieving student reading comprehension skills (Average Accuracy pre-test was 87.16, while average accuracy post-test was 96.1 on CAAS testing). |
| HayHaynes & Jenkins (1986) | average is about 46.4 min per day, or 232 min per week<br><br>Duration of reading instruction varied from 11 to 180 min per day<br><br>44% of time on reading activities | Direct Reading:<br>Oral Reading<br>Silent Reading<br><br>Indirect Reading:<br>Oral<br><br>Writing | NR | NR | NR |
| Jenkins, Schiller, Blackorby, et al., (2013) | about 150 to 300 min per week. | NR | Commercial Reading programs, such as Harcourt, Scott–Foresman, and Houghton–Mifflin | NR | NR |
| Mercer et al., 2000 | about 5-6 minutes per day, 5 days per week with 6-25 months | Phonics<br>Sight Phrases<br>Fluency | Great Leaps Program | Students made significant improvement in reading fluency during the intervention (group in 19 to 25 months: d=13.43, p<.0001; group in 10 to 18 months: d=2.67, p<.001; group in 6 to 9 months: d=2.01, p<.0001). | NR |
| Pyle, & Vaughn,. (2012). | NR | Word study<br>Fluency<br>Comprehension<br>Vocabulary | Individualized treatment (IT)<br>Standardized treatment (ST) | Students in the individual treatment did not demonstrate significant difference from students who received standardized treatment.<br><br>ST is more favorable to improve student word attack skills | Significant findings in improving student reading comprehension outcomes were found when students in the IT were combined with ST (d=0.23)<br><br>In tier 4, treatment students demonstrated significant higher scores on reading comprehension (d=1.20). |

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| | | | | In tier 4, treatment students demonstrated statistically significant improvement on word identification (d=0.49) | |
| Sorrells, & Linan-Thompson, (2005) | Time spent on decoding (10%-25%) | Decoding<br>Fluency<br>Vocabulary<br>Reading comprehension | Decoding- SPLIT; SRA/C; Corrective Reading Decoding program<br>Fluency - Repeated Reading, Sight words connected Text<br>Vocabulary- Verbal Associational Level Routines<br>Reading comprehension- Graphic organizer; Information web | Three of teachers implemented a repeated reading intervention for fluency | All teachers relied on traditional approaches in vocabulary instruction instead of cognitive/mnemonic strategies specifically useful for students with disabilities. |
| Spencer and Manis (2010) | More than 50 sessions per student | Fluency<br>Word Study<br>Reading Comprehension | Fluency Intervention Program: Great Leaps Reading (Campbell, 2005) | The experimental group made significant more progress than control group on phonemic decoding (d=0.41).<br><br>Statistically significant gains on Fluency (GORT-III Rate: d=0.59, Accuracy: d=0.62, and Passage: d=0.61). | No significant difference was found between the experimental and control group on reading comprehension. |
| Swanson, E. A., & Vaughn, S. (2010) | Phonological Awareness (2.75%)<br>Word Study (31.96%)<br>Fluency (8.86%)<br>Comprehension (25.57%)<br>Vocabulary (9.60%)<br>Spelling (3.35%)<br>Writing (6.84%) | Phonological Awareness<br>Word Study<br>Fluency,<br>Comprehension<br>Vocabulary<br>Spelling<br>Writing | Text reading Instruction:<br>Supported Oral reading<br>Choral Reading<br>Independent Silent Reading<br>Independent Oral Reading<br>Teacher Read Aloud | On average, 2.75% of the instructional time was spent on phonological awareness, 31.96% on Word Study, and 8.86% on Fluency.<br><br>40.63% (n = 13) of students made more than four months' growth in silent reading fluency as measured by the TOSCRF | On average, 25.57% of the instructional time was spent on reading comprehension, 9.60% on vocabulary, and 6.84% on writing. |
| Torgesen, Alexander, Wagner, et al., (2001) | The overall reading instructional time was about 67.5 hours across 8 weeks. | Phonological awareness<br>Word Study<br>Reading Comprehension | the Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (Lindamood & Lindamood, 1998)<br><br>an embedded phonics approach developed by the researchers | After the intervention, still about one third of students were still performing below the average on phonemic decoding skills and word reading fluency. | Outcomes for the measures of reading comprehension demonstrated that 66% of the children obtained scores within or above 1 standard error of measurement of their receptive language score. |

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| Vaughn, Moody, & Schumm (1998) | NR | Word recognition and decoding<br>Comprehension | Whole Language Instruction, Phonics Worksheets | Three out of eleven teachers provided word recognition or decoding instruction. Two teachers used phonic worksheets for supplement instruction | 11 teachers taught reading comprehension by either reading the story aloud or having the groups take turns reading the story followed by teacher asking questions.<br><br>By the end of the study, compared to typical peers, the students in this study made little to no growth in reading. |
| Vaughn, Wexler, Roberts, et al., (2011) | Depend on student needs:<br>35 to 43 min of instruction in vocabulary/morphology,<br>170 to 180 min in comprehension/text reading, and 15 to 25 min of the motivational component during a 5-day week | Fluency<br>Word Study<br>Vocabulary<br>Reading Comprehension<br>Spelling<br>Motivation | Standardized Intervention: REWARDS (Archer, Cleason, & Vachon, 2003)<br><br>Individualized Intervention: Wilson Reading System (1996) | The effect sizes on WJ Letter Word Identification were .28 and .44 for the individualized protocol and the standardized protocol, respectively.<br>Word Attack (d=.14) and (d=.45), Letter Word Identification (d=.31) and (d=.36) respectively. | Students made significant gains in reading comprehension, as evidenced by a moderately high impact (ES = .56) |

Table 5

*Studies of Evidence-based Reading Pedagogy at Tier Three Settings*

| Studies | Teaching Pedagogy | Advance Organizer | Extensive Teacher Modeling | Multiple Opportunities to Practice | Corrective /specific Feedback | Scaffolding Instruction | Fidelity of Implementation | Other Teaching Behaviors |
|---|---|---|---|---|---|---|---|---|
| Allor, Mathes, Roberts, Cheatham, & Otaiba (2014) | Systematic and Explicit Instruction | NR | NR | Activities toward phonological awareness, word recognition, and comprehension | NR | Gradually increase the difficulty in curriculum | Intervention teachers were observed multiple times (3 times) per year using a three-point rating scale for the fidelity check. The fidelity ranged from 67% to 89% with a mean of 82%.. | NR |
| Giess, Rivers, Kennedy, & Lombardino, (2012) | Explicit instruction, but the effect of the explicit instruction was not reported. | NR | NR | NR | NR | NR | Teacher were observed a day per week over weeks for the fidelity of implementation and the inter-rater reliability was 88% on average. | NR |
| Graham et al., 2007 | NR | NR | NR | a number of short and focused activities for word recognition, reading fluency, and comprehension | NR | NR | NR | NR |
| Graham, Pegg,& Alder, 2007 | Explicit Instruction | vocabulary check | NR | a variety of practice and recall strategies for students to improve reading skills<br><br>timed independent practice activities | immediate and informatie feedback | revision of current content<br><br>sequence of learning activities | NR | NR |
| HayHaynes & Jenkins (1986) | 44% of the time for reading activities | NR | 5% of the instructional time | averaged 9.95min of direct reading | 17% of cognitive monitoring | NR | Teacher was observed | Non-interaction |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Totally, 56% of the time student spent on nonreading activities (management, waiting, off-task)<br><br>the direct reading time ranged from 5.42 min to 22.04 min | | on demonstrations | and 8.59 min of indirect reading<br><br>52% of time (25.12 m,in) in individual work, with small group (19%), and one-to-one instruction from a teacher (16%) | | | The mean Kappa of the overall inter-rater reliability was .91. | Instructional: 58%<br><br>8% of the time on management |
| Jenkins, Schiller, Blackorby, et al., (2013) | tier 3 reading intervention ranged from 25 to 80 min per day<br><br>75% of respondents, tier 3 was 30 to 50 min per day. | NR | NR | NR | NR | NR | NR | 46.4% of schools used a model of tier 1 plus tier 3 for students with disabilities; 20% of the schools used Tier 3 or tier 4 models only; And 18% operated three tiered models |
| Mercer et al., 2000 | Explicit Instruction | NR | Teacher modeled the correct pronunciation of phonemes, syllables, or non-sense sounds | Student were asked to read as many sounds as possible in 1 min | Teacher provided corrective feedback | differentiated instruction, such as if students hesitated to read for more than 3 seconds, the instructor supplied the sound or word | NR | NR |
| Pyle, & Vaughn,. (2012). | NR | NR | NR | NR | NR | NR | The fidelity of implementation was obtained four times a year, with The mean total fidelity ranking ranged from 2.26 to 2.56 on a 3-point Likert rating scale, | NR |

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|---|---|---|---|---|---|---|---|---|
| | | | | | | | ranging from 1 (low) to 3 (high) | |
| Sorrells, & Linan-Thompson, (2005) | Direct instruction: breaking down and teaching skills in small steps, providing explicit practice with corrective feedback, and controlling or reducing the complexity of the task; scaffolds, feedback. | NR | One of four teachers modeled the thinking process for decoding visible. | Three of the teachers provided guided practice of decoding, including individual reading, computer practice, guided and independent practice of decoding strategy | Specific corrective feedback included supplying correct responses and probing to check for understanding, and guiding students to practice the correct response. | All teachers provided instruction to control of task difficulty, such as breaking tasks into pieces | Document the fidelity of implementation of each reading interventions | NR |
| Spencer and Manis (2010) | NR | NR | NR | NR | NR | NR | The implementation was observed by the researcher a few weeks into the study<br><br>Daily records<br><br>timely feedback | NR |
| Swanson, E. A., & Vaughn, S. (2010) | NR | NR | only 0.32% of the instructional time on teacher read aloud | Students spend about 2.94% of the instructional time on supported oral reading, 6.75% of the instructional time on independent silent reading. No choral reading was provided in the observed instruction | NR | NR | NR | NR |
| Torgesen, Alexander, Wagner, et al., | Explicit Instruction of Embedded Phonics instruction | Introduction and practice in reading sight | The most common spelling and phonemics | practice oral reading in trade book or basal. | error-correction procedures were used in guided | The ADD group spent 5% of time applying word- | NR | NR |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| (2001) | was provided | words | skills were demonstrated<br><br>Modeling of blending sounds to form words were provided | Sight word practice<br><br>Spelling practice | practice | level skills to reading and comprehending text. EP group spent 50% of time in meaningful activities and comprehending text.<br><br>Control text difficulties were also applied on ADD groups. | | |
| Vaughn, Moody, & Schumm (1998) | Respond to students, monitoring, provide feedback, communicate expectations, redirect tasks, group practice, individualized practice | The scale of 1-4 (frequently) revealed that teacher use independent activities and individual activities are 2.76 and 1.71 respectively | NR | NR | Provide positive feedback is 3.34 on the likert scale, and monitor and respond to the need of students were 3.37 and 2.90 respectively. | NR | the observation was implemented for each of the 14 classrooms. The interrater agreement was .85 or higher | NR |
| Vaughn, Wexler, Roberts, et al., (2011) | NR | NR | NR | NR | NR | NR | Observe the implementation of intervention four to five times a year for each teacher.<br>Collected by using Likert-Scale coding | NR |

*Study Design*. The corpus of studies included 38% (n= 6) group experimental (treatment and comparison), 25% (n=4) group quasi-experimental, 6% (n= 1) case studies (Sorrells, & Linan-Thompson, 2005), 6% (n=1) survey research (Jenkins, Schiller, Blackorby, et al., 2013), 6% (n=1) mixed studies (Bentum, & Aaron, 2003), 19% (n=3) qualitative/direct observational (HayHaynes & Jenkins,1986; Swanson & Vaughn, 2010; Vaughn, Moody,& Schumm,1998), and no single-subject design studies were found in Tier Three reading research.

*Sample Characteristics and Settings*. The five studies targeting late elementary (grades four and five) have sample sizes that ranged from 32 to 117 (mean was 70 participants), and the sample sizes of teachers ranged from 4 to 62. In the included studies, 4 out of 5 (80%) of the studies involved students with identified disabilities in Tier Three instruction (86% of students with learning disabilities, 12% of students with other disabilities, 2% of struggling students without disabilities). Another eleven studies in secondary schools included sample sizes of students ranged from 9 to 394, with the average of 114 participants, and four to eight teachers. In the included studies, 73% of the research studies (n=8) involved students with identified disabilities in Tier Three instruction, 27% (n=3) of struggling readers without disabilities identified. Approximately eight studies were conducted in resource rooms, one study was implemented in a self-contained special education classrooms (Spencer & Manis, 2010), and another three studies did not report the setting (Giess, Rivers, Kennedy, & Lombardino, 2012; Pyle, & Vaughn,. 2012; Vaughn, et al., 2011).

*Group Size*. Based on the common principles of Tier Three literacy instruction (Wanzak & Vaughn, 2008), group size differentiates the tertiary intervention from the other tiers. In this literature review, only three studies implemented interventions for students in a 1:1 group size with one teacher instructing one student (Mercer et al., 2000; Spencer & Manis, 2010; Torgesen

et al., 2001), three studies implemented interventions for students in a group of 1:2 or 1:3 with one teacher instructing two or three students (Gabor, 2010; Graham et al., 2007; Graham, Pegg,& Alder, 2007), eight studies had the group ranging in size from 3-5 students (e.g., Allor et al., 2014; Bentum, & Aaron, 2003; HayHaynes & Jenkins, 1986), and three studies (e.g., Giess, Rivers, Kennedy, & Lombardino, 2012) had varied group size based on student needs.

*Intensity of the Instruction*. In addition to group size, most studies (94%) reported the intensity of reading instruction (e.g., Jenkins, Schiller, Blackorby, et al., 2013; Torgesen et al., 2001; Pyle, & Vaughn,. 2012), and eight studies described the fidelity of instructional implementation (e.g., Sorrells, & Linan-Thompson, 2005; Spencer & Manis, 2010; Vaughn, et al., 2011). The intensity of intervention ranged from 5-6 minutes per day/five days per week to daily with two 50 minutes of instruction per day. The duration of the implementation ranged from 3 months to 3 years, with the average of 14 months across studies. As can be seen in Table 3, 44% of studies (n=7) provided intervention for students on a daily basis (average 50 minutes per day) (e.g., Allor, et al., 2014; Giess, Rivers, Kennedy, & Lombardino, 2012; Mercer et al., 2000). Other studies provided intervention for students 2 or 4 times per week, with approximate 1.5 hours to 3.5 hours of intervention.

*Data Analysis Reported.* Nine (56%) studies reported both descriptive and inferential statistics, six studies calculated effect size, two studies used qualitative analysis, four studies reported inter-rater reliability over and above 20% of the total observation time (Giess, Rivers, Kennedy, & Lombardino, 2012; HayHaynes & Jenkins,1986; Swanson & Vaughn, 2010; Vaughn, Moody,& Schumm,1998), and no studies was found to report visual analysis.

*Overall Reading Outcomes.* Eleven studies (69%) described the reading interventions implemented at Tier Three settings and student response toward the intervention were measured;

five studies (31%) observed typical teaching behaviors at Tier Three reading instruction and the teacher behaviors were systematically observed. Among these studies, two reported significant results on one or more Tier Three reading interventions/instruction at upper elementary settings (Allor, et al., 2014; Torgesen et al., 2001). Another three studies did not report findings on student reading achievements with the implementation of Tier Three reading interventions at upper elementary grades (Jenkins, et al., 2013; Swanson & Vaughn, 2010; Vaughn, Moody,& Schumm,1998). Additionally, 63% of studies (n=7) reported significant results on one or more Tier Three reading interventions/instruction at secondary settings (e.g., Giess, Rivers, Kennedy, & Lombardino, 2012; Pyle, & Vaughn, 2012). However, some findings revealed that after months of intensified interventions, no significant difference was found on reading comprehension from pretest to posttest for students with disabilities (Spencer & Manis, 2010). Considering struggling adolescent readers have more serious academic deficits than younger children, the remediation of the instruction probably need longer duration (i.e. more than a year) specifically for students with disabilities and require evidence-based instruction with fidelity reported or observed in intensified instruction.

**Studies of Reading Components at Tier Three Instruction**

Overall, 94% (n=15) of included studies from grade 4 through 12 addressed some critical reading components in implementing the Tier Three instruction (Table 4). In targeting the critical reading components, eleven studies (69%) described general reading comprehension; twelve studies (64%) in word study (e.g., phonological awareness, letter-sound correspondence, word decoding, and fluency skills); five studies (31%) in writing skills (e.g., spelling); five studies(36%) in vocabulary; only one study (6%) in motivation (Vaughn, et al., 2011); And no

study was found in cognitive strategies or text structure, which are critical in tertiary instruction and improving student reading comprehension skills.

Approximatly13 reading programs across studies were presented from studies to investigate the effectiveness of reading components in improving student reading achievements at Tier Three settings (Table 4).

*Word Recognition*. Ten reading programs were specifically applied to remediate student word study skills in tertiary interventions, including the Orton-Gillingham Program (Bentum, & Aaron,2003), the Barton Reading and Spelling System, SPLIT, SRA/C (Giess, Rivers, Kennedy, & Lombardino, 2012), QuickSmart (Graham et al., 2007), Corrective Reading Decoding Program, Repeated Reading Program, Sight Words Connected Text (Sorrells, & Linan-Thompson, 2005), the Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (Torgesen et al., 2001), An Embedded Phonics Approach (Torgesen et al., 2001), REWARDS (Vaughn et al., 2011), Wilson Reading System(Vaughn et al., 2011), and Great Leap Reading Program(Mercer et al., 2000; Spencer & Mains, 2010).

Seven studies reported significantly positive effects on critical reading instruction after exposing students to intensified tertiary word recognition reading programs (Allor et al., 2014; Giess, Rivers, Kennedy, & Lombardino, 2012; Mercer, et al., 2000; Pyle, & Vaughn,. 2012; Spencer and Manis, 2010; Swanson & Vaughn, 2008; Torgeson et al., 2001; Vaughn et al., 2011). Another four studies either did not report significant findings in improving reading skills, or did not investigate the effectiveness of the Tier Three instruction on student reading achievements. Among studies that reported significant findings in word recognition, the effect size of fluency were varied from 0.60 to 13.43 and word decoding varied from 0.28 to 1.05, respectively. Additionally, only one study reported small effect size (d= 0.22) on phonological awareness (PA)

instruction toward students with severe reading difficulties, other studies either did not report the findings or no significant results was reported from student reading outcomes with intensive PA instruction.

Giess and colleagues (2012) investigated the high school student reading achievements after the implementation of remedial reading programs (the Barton Reading and Spelling system-BRSS) at Tier Three settings. Results of this study demonstrated that struggling adolescent readers gained medium to large improvement on spelling (d=0.53), word decoding (d=1.05), and sound awareness skills (d=0.54) and a small improvement on phonemic decoding and letter-sound correspondence (d=0.22). The study also concluded that older students in remedial reading programs must have a solid foundation of phonological awareness skills and the explicit instruction provided the effectiveness in improving the word recognition and spelling abilities for older struggling readers.

The findings of the Giess et al., (2012) study compared favorably with the other Tier Three reading research that have employed reading interventions with older struggling readers in secondary schools. Pyle and Vaughn (2012) indicated that treatment students showed statistically significant gains on standardized reading comprehension measures (d=0.23) and a standardized word identification measures over the course of the year. In addition, an intensive and individualized intervention provided to students with severe reading difficulties demonstrated significantly higher scores on both word identification (d=0.49) and reading comprehension (d=1.20) than pretest scores. The only concern of this study was that the intensive individualized instruction did not close the achievement gap. Most struggling students continued lacking grade-level proficiency in reading compared with typically achieving students.

Middle school students with severe reading deficits who received supplemental program Great Leaps Reading in Spencer and Manis (2010) made significantly more progress than their peers assigned to the control group on phonemic decoding skills (d=0.41). Students also made statistically significant gains on fluency of all of the GORT-III assessments, with moderate to large effect sizes (Rate: d=0.59, Accuracy d=0.62, and Passage, d=0.61). Results of the study also indicated the opportunity to work intensively for 10 minutes per day with a trained adult on fundamental word study would greatly benefit adolescent readers with severe reading difficulties in improving fluency and word decoding skills in reading.

For students in upper elementary grades, Torgeson et al., (2001) described although student academic achievement did improve, it did not close the achievement gap between achievements among struggling students and their typical peers. Authors in this study gave intense reading instruction to 60 students with severe reading disabilities in grades three through five. Each of these students had word recognition scores below the fifth percentile when identified for the intervention study and had been identified for special education in public schools. Each student received instruction using one of two interventions: (a) the Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (Lindamood & Lindamood, 1998); or (b) an embedded phonics approach developed by the researchers. The students in both groups made dramatic gains in age-adjusted standard scores on measures of both decoding (d=.44) and comprehension (d=0.56) and maintained their gains 2 years after the conclusion of intervention. Moreover, about 40% of the tutored students were able to return full-time to the general education classroom in the year following the intervention, no longer in need of special education services. However, many of the students still remained as slow readers and the gap was still there between student current reading performance and grade-level expectation.

*Language Comprehension*. In language comprehension, six general reading programs (Early Intervention in Reading, Graphic Organizer, Information Web, QuickSmart, Wilson Reading System, Great Leap Reading Program) were specifically applied for general reading comprehension for adolescent students in tertiary instruction. Another two reading programs for vocabulary instruction (Verbal Associational Level Routines, REWARDS), four reading programs for writing and spelling (The Orton-Gillingham Program, the Barton Reading and Spelling System, REWARDS, Wilson Reading System), and no specific reading programs/instruction were found to remediate student skills in cognitive strategies and text structures.

Among these reading programs for language comprehension, *Early Intervention in Reading Program* (Allor et al., 2014), *QuickSmart* in Graham, Pegg,& Alder, (2007), and *Wilson Reading System* in Vaughn, Wexler, Roberts, et al., (2011) were found to be effective in improving student skills in comprehending texts. The other three reading programs (*Graphic Organizer, Information Web, Great Leap Reading programs*) either did not demonstrate positive results in student reading comprehension (e.g., Spencer & Manis, 2010) or this information was unavailable (e.g., Sorrells, & Linan-Thompson,2005). For example, no significant difference was found between the experimental group with intensified instruction on reading comprehension after implementing Great Leap Reading Program to middle school students with disabilities (Spencer & Manis, 2010).

Still the implementation of four reading programs in included studies (e.g., Hermann Phonics; Phonics Worksheets) had no effects presented in Tier Three research. For example, the phonics-based strategies (Hermann Phonics, the Orton-Gillingham method for LDs, and the Eclectic strategies) implemented in Bentum, & Aaron (2003) demonstrated no significant

improvement for middle school students with LDs in reading comprehension, word study, and writing after three years of instruction. Instead, there was a decline in three of these skills after long exposure to intensified instruction in resource rooms. As demonstrated, two major reasons are cited: (1) students lost interest in reading instruction in longitudinal study; (2) the fidelity of instruction is generally lacking during study.

Overall, few research studies reported the significant findings toward language comprehension instruction on student reading outcomes. Most of the studies either did not report findings or no significant results were generated. Among the studies with significant findings in language comprehension, the effect size of reading comprehension instruction was varied from 0.23 to 0.69. Regarding writing instruction as reported in three research studies (Bentum & Aaron, 2003; Gabor, 2010; Giess et al., 2012), only one reported the significant results from pre and posttest after the implementation of writing instruction in tertiary setting, with a medium effect size of 0.53. Another two studies did not find any significant differences on both standardized tests and research-generated tests on student reading and writing outcomes.

Activities coded as comprehension instruction in Swanson and Vaughn (2010) represents that on average, 25.57% of the total instruction was observed on reading comprehension. Strategy instruction comprised 148 minutes (26.57%) of instructional time. Another important component in language comprehension instruction is reading comprehension monitoring with a total of 369 minutes (66.25% of comprehension instruction time). As observed, special education teachers in intensified instruction spend less time on activating student prior knowledge (5% of the comprehension instructional time), which is extremely critical in building student self-efficacy and interest prior to reading. Additionally, a total of 209 minutes (9.60% of the instructional time) was on vocabulary instruction and 6.84% of the total instructional time on

writing activities. Although in the study there were no statistically significant differences between the pre and post-test on the reading comprehension, students did make significant gains in off-grade-level reading (e.g., reading materials are one or two grade level below typical peers).

Allor et al., (2014) described a supplemental reading instruction (Early Intervention in Reading) for students with disabilities and their cumulative findings of a 4-year longitudinal study. Students in the treatment group received the supplemental instruction daily in a small group of 1 to 4 for approximately 40-50 minutes per day. Results of this study demonstrated students in the treatment group made significantly greater gains on reading comprehension (d=0.69) and word recognition. This result indicated what is possible for students with disabilities if they are given access to the evidence –based reading instruction and was delivered with consistent explicit instruction and fidelity.

Vaughn, Wexler, Roberts, et al., (2011) conducted an experimental research study over a year to investigate the effectiveness of individualized reading programs and standardized reading programs and their differences. This was a follow-up study designed for those students who did not respond to Tier Two instruction and determined to move to Tier Three. Researchers randomly assigned inadequate responders to one of two Tier Three treatments (Independent Intervention and standardized Intervention- REWARDS) for a full year of intervention. Results of this study demonstrated no significant difference was found toward the standardized (d=0.44) and individualized treatment (d=0.28) based on student needs and modification of instruction. The performance of individualized group did not differ significantly from the comparison group (Standardized intervention). However, statistically significant gains for reading comprehension (d=0.56) from students in individualized instruction was noteworthy. This result also suggested that students in the individualized instruction not only improved their overall outcomes of

reading comprehension, but also closed the achievement gap between their reading performance and the grade-level expectations.

The findings of Pyle and Vaughn (2012) agreed with Vaughn, Wexler, Roberts, et al., (2011) in that middle school students receiving intensified instruction achieved higher scores than comparison groups in reading comprehension ($d$=1.20). Statistically significant improvement ($d$=0.23) on reading comprehension was found when students in the individualized treatment (e.g., intervention tailored to meet individual students' need) also received standardized treatment (e.g., three-phase structure as secondary instruction: word study, vocabulary, comprehension, reading strategies).

However, reports of vocabulary were overwhelmingly missing from the corpus of studies. Among the two studies (Swanson, E. A., & Vaughn, S. 2010; Vaughn et al., 2011) that included vocabulary instruction, no single report was provided regarding the effectiveness of the program on student vocabulary achievements. The reports of writing instruction were even less available. Two studies (Bentum, & Aaron, 2003; Giess, et al., 2012) described using the similar reading programs/interventions (Orton-Gillingham Reading Program), however, the results of implementing the similar program was completely different: Giess, et al., (2012) reported significant gains from the program (effect size=0.53); while, Bentum, & Aaron (2003) found no significant improvement in reading comprehension, word recognition, and writing after the program was implemented. Instead, the mean score of writing as described in the research was decreasing from average pretest score of 78.3 to posttest (76.3). This result, as described in the study, indicated a long term (more than 3 years) intensified instruction does not make any significant differences in student reading skills; sometimes may detrimental to student self-efficacy and engagement in instruction.

**Studies of Reading Pedagogy toward Tier Three Instruction**

Swanson (1999a, 1999b) argued strong evidence was found in the research to support three pedagogical recommendations: (a) providing explicit instruction, (b) using direct and explicit comprehension strategy instruction, and (c) providing struggling readers with opportunities for extended practice and interpretation of text meaning in instruction and for increasing student motivation and engagement in literacy learning.

Among the 16 studies, six (38%) described using specific evidence-based reading pedagogy in implementing the reading programs/strategies (Giess, Rivers, Kennedy, & Lombardino, 2012; HayHaynes & Jenkins, 1986; Mercer et al. 2000; Sorrells, & Linan-Thompson, 2005; Torgesen et al., 2001; Vaughn, Moody,& Schumm,1998), partly including providing advance organizer, modeling, repeated practice, sequencing, controlling task difficulties, and opportunities for questioning and feedback (Table 5).

The picture of reading pedagogy revealed that only 5% of the instructional time on demonstration, 44% of the time on reading activities (Sorrells, & Linan-Thompson, 2005; Vaughn, Moody,& Schumm,1998), and limited instructional time spent on active teaching, including extensive and specific feedback (Sorrells, & Linan-Thompson, 2005; Vaughn, Moody,& Schumm,1998). Additionally, the reading instructional time was varied ranged from 11 minutes to 180 minutes per day to be responsive to the diverse needs of students (Vaughn, Moody,& Schumm,1998).

Only one study has investigated the effects of reading pedagogy toward student reading achievements (HayHaynes & Jenkins, 1986). Hayhaynes and Jenkins (1986) revealed on average, teachers in intensified instruction spent approximately 5% of instructional time on demonstration, including 9.95 minutes (25%) of direct reading instruction (e.g., reading the book,

reading the sentences), and 8.95 minutes (19%) of indirect reading (e.g., asking questions or vocabulary instruction). In addition, about 17% of the instructional time was spent on cognitive monitoring (e.g., monitoring student responses, asking questions, as well as directing/listening students to read). However, as demonstrated in this observational study, teachers spent very little instructional time on providing feedback and 58% of the time was observed as the non-interaction instructional time with students. Findings from this study suggested teacher instruction was a significant predictor accounting for 38% of the variance of student reading behaviors. Additionally, an increment of approximately 1 min of teacher instruction predicted a 1 min increment in student reading.

Teaching behaviors were reported in 57% of research studies with direct observation or online survey. Approximately 88% of the observation happened in resource rooms and 12% were obtained from online survey. The observation materials are varied, including SOBR (a research designed time sampling coding sheet), Field Note Template (a research designed template for observation), Instructional Content Emphasis-Revised (ICER-R; Edmonds & Briggs, 2003), The CISSAR (Code for Instructional Structure and Student Academic Response; Greenwood, Delquadri, & Hall, 1978), and the Classroom Climate Scale (McIntosh et al., 1993). Only five studies reported interobserver reliability, with one study reported the Cohen's Kappa coefficients ranged from .65 to 1.0, and four studies reported the reliability (80% to 100%).

Of the included observational studies in the review, the majority of studies were targeted at scheduling, observed reading activities/instructions, amount of time allocated to reading instruction, and amount of time engaged in non-reading activities. Given the substantial variation, the average duration of assignment to resource rooms for reading instruction was 45 minutes per day, or 4 hours per week. The distribution of scheduled time varied across students as well: 93%

of students received intensified reading instruction daily, and 7% of students received intensified instruction for 3-4 days per week.

As stated in Leinhardt et al., (1981), time spent on reading instruction/activities predicted reading achievement. Among the observational studies, in resource rooms, students in intensified instruction spent an average of 44% the time scheduled for reading activities, 56% of the scheduled time on non-engagement time (e.g., off-task activities, out of room, behavior management, transition from classes to classes or from activities to activities), 50% of the scheduled time on interaction non-instructional activities (e.g., talking about the weather or topics unrelated to the instruction), and almost 60% of the scheduled time on non-interaction instruction (e.g., teacher write on the blackboard without interaction with students).

The observational research also revealed teachers assigned students in individual seatwork (20%), with small group (12%), whole-group (46%), and one-on-one instruction (22%) on the average student-teacher ratios 4:1. Given the goal of the Tier Three instruction in resource rooms is to provide intensified individualized intervention to remediate student reading difficulties, sizable amount of individualized and one-on-one help is expected to happen as frequently as possible in Tier Three settings. However, as reported in observational research, most of teachers spend their majority of instructional time on whole group instruction. Additionally, the most frequently implemented individualized instruction as described was asking questions after reading and students passively responding to the reading tasks (Swanson, 2008; Thurlow et al., 1983). The corresponding amount of time student engaged in academic responding in intensified instruction was also limited (approximately 29 minutes on average only). As engaged time is important to academic success (Denham & Lieberman, 1980),

although struggling readers received intensified instruction in reading as expected, the efficiency of instruction and student engagement are questionable.

Beyond instructional time, other teaching behaviors, such as interaction and non-instructional behaviors were also indicated in HayHaynes and Jenkins (1986). At intensified instruction, approximately 55% of the instructional time students engaged in non-interaction instructional activities with the teacher, meaning students engaged in activities without teacher support and feedback. In addition, 50% of the instructional time was found to engage in interaction non-instructional activities, with more class time was reported on transition or non-engaged activities as an example.

## Discussion

### General Findings

Overall, this literature review reported on the effects of intensified tertiary reading interventions provided to adolescent students with reading difficulties or disabilities in grades 4-12. Three questions were addressed in literature review: (a) To what extent does the research address the tier 3 literacy instruction in secondary schools? (b) How does literacy intervention research address reading components toward tier 3 instruction for students with reading difficulties? And (c) How does literacy intervention research address reading pedagogy toward tier 3 instruction for students with reading difficulties? Results from this review indicated varied effects of intensive tertiary instruction on reading comprehension and word recognition outcomes on adolescent struggling readers.

#### (a) To what extent does the research address general Tier Three literacy instruction in upper elementary and secondary schools?

In general, students in effective research studies who responded to the Tier Three interventions have the following characteristics: (a) on average, 81% of students were native English speakers, 61% males, 22% of Caucasian, 37% of African American, 37% of Hispanic, and 4% of other minority groups; (b) majority of participants (80%) had a primary classification of specific learning disabilities; (c) 75% of students demonstrated one standard deviation below average ability in single word spelling, reading, and decoding, and another 25% of students demonstrated at least 1.5 standard deviation below average ability for their age; and (d) 86% of students in Tier Three instruction received free or reduced lunch as well at schools. The student characteristics in this review agrees with previous research findings (e.g., Vaughn & Wanzak, 2010) that students in this tier generally have more severe difficulties in literacy and always more than one significant difficulty present in instruction. According to the National Center on Intensive Intervention (2013), intensive instruction is intended to meet the needs of students: (a) who are not making adequate progress with severe reading difficulties; and/or (b) whose reading skills are still lacking and consistently not making adequate progress to meet IEP goals, such as students with learning or reading disabilities. Although Tier Three instruction is not equal to special education services, adolescents with disabilities especially at secondary levels and who are diagnosed as certain learning or reading difficulties are especially needed to receive intensive Tier Three instruction to remediate their severe reading problems and to meet their IEP goals.

*Grade Level*. As only two research studies were conducted in high school settings, high school Tier Three literacy instruction is considered to be a significant gap in literature. However, high school students with severe reading problems especially need more intensive instruction for two reasons: (a) adolescents with reading difficulties present a more complicated array of weakness in both word recognition and language comprehension deficits, which takes more

effort to intervene and improve, and (b) based on Shanahan and Shanahan (2008), when students transit from elementary to secondary schools, disciplinary literacy dominate the major purpose of reading comprehension, which requires not only fundamental reading proficient but higher order thinking skills in comprehending content-specific text. For those who are still struggling in fundamental reading (i.e. word decoding), disciplinary literacy becomes an extreme challenge. Therefore, providing intensive tertiary instruction to high school students with severe reading needs is highly needed and required to remediate their reading skills in word recognition and language comprehension.

*Intensity of Instruction*. Studies with the group size description in instruction revealed on average, the group size of tertiary instruction is around 1 to 5. Based on this review, students in one-on-one group size make better results than those in the group size of more than 6 students. This finding agrees with Vaughn and Wanzak (2014) that interventions with one-on-one instruction had higher effects than students in group instruction at elementary grades. However, in secondary schools, the group size does not make significant differences in struggling student reading outcomes based on this systematical literature review. Simply reducing the group size may not be effective in improving adolescent reading skills, especially for those students with severe reading problems and learning disabilities (Bentum, & Aaron, 2003; Giess et al., 2012; Spencer & Manis, 2010; Vaughn et al., 2011; Vaughn & Wanzak, 2014).

Another way to intensify the instruction is to extend the duration of the implementation. Research studies in this review were consistent that students with significant reading problems require more intensive instructions that should last at least 1 year or longer, as these students experience longitudinal difficulties in reading and they need more time to remediate their skills and make progress in reading. With more than one-year individualized, intensified intervention

for struggling adolescent readers, sufficient financial and resources support in implementation from schools and districts should be considered ahead of time. Given the social and community costs of poor reading skills, especially struggling adolescent readers from urban, poor school districts, the financial support will be a big challenge in most schools.

**(b) How does literacy intervention research address reading content toward Tier Three instruction for students with reading difficulties?**

Considering adolescent reading instruction, most teachers in intensified instruction implemented word-level intervention (44% of instructional time on average), such as word decoding, fluency, phonological awareness as their primary approach to teach reading. In contrast, vocabulary instruction and reading comprehension instruction (especially text structure and cognitive strategies) were limited, with 9% and 25% of observed instructional time on average respectively. Another issue indicated from studies was the effectiveness of vocabulary instruction in tertiary settings is generally lacking from previous research studies. For those studies that implemented vocabulary instruction in Tier Three settings, the relationship between the instruction and student outcomes was not reported and still a mystery from others. Therefore, the vocabulary instruction in intensified setting should be the focus in future vocabulary research and more recommendation and effectiveness is encouraged to be provided for practitioners in the future.

*Word Recognition Instruction*. As indicated by literature review, word recognition in tertiary instruction is associated with medium to large effect size on fluency. Especially, the reading program (Great Leaps Intervention: repeated reading) works more effectively than other reading programs found in this literature review (i.e. Quicksmart) and generates the highest effects in improving adolescents' fluency skills. This finding is important, especially for

adolescents with disabilities and struggling adolescent readers in secondary schools. It is valuable to understand that providing fluency instructions especially works well when providing repeated reading instruction in most intensified settings. Students who have severe reading difficulties need to practice multiple times to become fluent in letter-sound and spelling-to-speech correspondences, and this instruction should be provided and most likely to be remediated.

However, the report and effects of word recognition, specifically fluency, on student reading comprehension is varied. Some studies in this review demonstrate small effects, and most studies did not report significant findings on improving student reading comprehension skills with fluency instruction only. This supports previous research findings (Kuhn & Stahl, 2003) that simply improving student fundamental skills in reading accurately in an appropriate pace and prosody is not enough. Fluency instruction helps students read the text accurately in an appropriate rate and prosody, and bridges word decoding and reading comprehension; however, reading comprehension is more than fluent reading. It integrates and challenges student background knowledge, vocabulary, as well as other higher order thinking skills and strategies in passage comprehension. In secondary schools, given the requirements of disciplinary literacy, struggling adolescent readers with severe reading difficulties need not only reading fluency practice in the short term, but long-term efforts on reading comprehension improvement to meet the standards of Common Core in Tier Three instruction.

*Language Comprehension Instruction*. As indicated in this review of studies, the effect sizes on improving student general reading comprehension skills are ranged from small effect size of 0.23 to medium effect size of 0.69. For studies with significant findings, the duration of instruction generally lasts at least a year to remediate student comprehension skills. Some studies

even conducted more than two years of intensive instruction based on student special needs. Considering the reading problems among struggling adolescent readers and students with disabilities are complicated and hard to address, it is noted from this review that it is still possible to remediate adolescents' reading comprehension skills if intensified instruction is provided with necessary duration.

Although reading programs are varied across studies, most programs with effective reading comprehension instruction are evidence-based and suggested by previous studies (i.e. Fuchs & Deshler, 2007) in Tier Three instruction, such as REWARDS, Wilson Reading, and Great Leaps Instruction. New educators are encouraged to consider these reading programs in order to appropriately address student reading needs. These evidence-based reading programs also provide fundamental instructional suggestions for educators to consider in implementing high quality Tier Three instruction for most at-risk adolescent readers. On the other hand, educators might want to balance the instruction on word recognition and language comprehension given student reading needs and closely monitor student responses toward programs.

Choosing appropriate reading programs to address student needs is also critical. Educators might want to consider those that have been investigated and proven to be effective in similar grade levels as target students in previous Tier Three research findings. Other reading programs although have demonstrated to be effective to remediate student reading skills in early literacy, does not guarantee that these reading programs are effective to improve student overall reading (including comprehension) for adolescent readers. Among all the 13 reading programs proposed in this literature review, six programs were found to be especially effective for secondary adolescent readers, including the Barton Reading and Spelling System (BRSS; Barton

2000) for word recognition and spelling, the Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (Lindamood & Lindamood, 1998) for word study, spelling, and reading comprehension, Great Leaps Reading (Campbell, 2005) for reading fluency, and REWARDS, Wilson Reading (Archer, Cleason, & Vachon, 2003) and QuickSmart (Graham et al., 2007) for reading comprehension.

Vocabulary instruction, however, is found to be a huge gap from literature review. Adolescents with reading difficulties generally lack enough vocabulary in reading comprehension. Especially, in high schools, students are required to decode content specific texts with sufficient concepts in mind. As vocabulary knowledge is the single greatest contributor to reading comprehension, building student knowledge on vocabulary is the prerequisite to get access to reading comprehension. Future research regarding vocabulary instruction in tertiary setting is necessary and critical.

*Multicomponent Instruction.* Majority of included Tier Three studies implemented multicomponent Instruction in tertiary settings. Results of reading instruction on student academic achievements agreed that secondary struggling readers need multi-component intervention approaches/programs that incorporate in all reading components (e.g., word study, phonological awareness, phonemic awareness, vocabulary, and comprehension). This finding was conflictive with Swanson and Vaughn (2013) that improving student fundamental reading skills sometimes does not actually transfer to gains and would make effective improvements on student reading comprehension, especially for struggling adolescent readers whose reading skills are two grades levels below their typical peers. This study demonstrated that all components regarding comprehension and fundamental reading skills are specifically encouraged to be addressed in Tier Three intervention.

**(c) How does literacy intervention research address reading pedagogy toward Tier Three instruction for students with reading difficulties?**

As indicated, without effective explicit instruction, the effects of reading programs although were proven to be effective in previous studies in other tiered settings might not be appropriate for the tertiary instruction provided to students with special needs. Before ruling out other variables on student reading achievements, it is important to investigate teacher instruction and teaching behaviors in implementation, specifically, the information on teaching pedagogy and fidelity of implementation should be a focus in future studies.

*Reading Pedagogy*. It is important to note that most studies did not report specific pedagogy that teachers implemented in the research. For studies (i.e. Giess, 2012; Hayhaynes & Jenkins, 1986; Mercer, 2000; Sorrells et al., 2010; Torgesen et al., 2001; Vaughn et al., 1998) that report pedagogical instruction, only a few instructional components are presented, such as opportunities to practice and scaffolding instruction. However, the effectiveness of presented instructional components, for example, increasing or decreasing the predictive power of treatment effectiveness, is not investigated and established in any study.

Our review of the literature revealed that modeling as well as corrective/specific feedback are generally lacking in intensive instruction for adolescent struggling readers (Hayhaynes & Jenkins, 1986; Sorrells et al., 2010; Torgesen et al., 2001; Vaughn et al., 1998). Struggling adolescent readers benefit from explicit instruction regarding modeling and providing corrective/specific feedback. Modeling and Correct/Specific feedback positively influence the magnitude of treatment outcomes (Swanson, 1999b). In the modeling process, it is the teacher who demonstrates the learning process and thinks aloud the steps the students are to follow; In the process of providing corrective and specific feedback, anytime student demonstrated signs of

confusion, teachers need to intervene with specific feedback in details. Modeling and corrective/specific feedback are especially critical pedagogical components in tertiary instruction. Swanson (1999a) clearly identified high effect size of two pedagogical components in increasing the predictive treatment outcomes for students with learning disabilities. Without sufficient modeling instruction and providing specific feedback in the process, student learning and reading improvement are impeded. This type of collaboration among students in modeling and providing specific feedback is considered to be the process of constructing student knowledge in reading and learning. Results from this review do encourage educators to include explicit instruction in delivering tertiary lessons. Model and think out aloud how to solve a problem in steps and in logical order and reflect during and after reading, as well as encourage students to engage in the problem solving process with active self-monitoring of comprehending texts (Edmonds et al., 2009). During the modeling and in the process of practicing, educators are also encouraged to closely monitor student reading responses and provide corrective feedback specifically to clarify student learning questions and confusions (Mercer et al., 2000; Sorrells et al., 2005).

*Fidelity of Implementation*. Regarding the fidelity of implementation, few studies in this literature review demonstrated the fidelity of instruction and teacher implementation on reading instruction. Of the 16 included studies, only 8 provided a quantitative measure of fidelity, whereas none of the studies has investigated how fidelity relates to student reading outcomes. Without background information on teacher implementation of instruction, it is inappropriate to simply attribute student reading failures to other variables, such as the ineffectiveness of reading programs. Fidelity data are especially important when the negative and ambiguous data were found from the research studies and researchers have chances to investigate if the negative results were due to inappropriate intervention or because the instruction was not implemented as

designed (Swanson et al., 2013). As indicated, the intensity of instruction itself did not predict student academic achievements in tertiary instruction. The fidelity of instructional implementation along with intensity of instruction counts for the large variance in the significance of the results (Meents, 1990). Therefore, more research on the fidelity of implementation of evidence-based reading programs in tertiary instruction is dire for future studies.

**Methods in Addressing Tier Three Literacy Instruction**

With the systematic literature review, to address reading content and reading pedagogy in the literacy instruction at high school Tier Three settings, close the achievement gaps as well as improve teacher evidence-based instructional behaviors is highly needed. In this process, improve teachers' lesson planning skills to target student specific needs plays the critical role and is the prerequisite in Tier Three instruction.

According to Clark and Dunn (1991), lesson planning is "a psychological process of envisioning the future, and considering goals and ways of achieving them" (Panasuk & Todd, 2005). Lesson planning is the systematic planning of instructional materials, methods, activities, and assessments based on the goal of instruction (Panasuk & Todd, 2005). Effective planning requires an integration of content, pedagogy, and involves these critical components into instructional design based on student needs and the goal of instruction (Panasuk & Todd, 2005). It involves analysis of student needs, requirements, as well as develops a delivery structure to meet its needs. As lesson planning involves teachers' decision making process. In this process, understanding student needs as well as evaluate student current performance to make the decision would be critical. In addition, lesson planning also involves anticipation of student

reactions toward system of activities. Therefore, clear expectation and explanation of each designed activity is highly needed in the planning process.

To improve teachers' skills in lesson planning, a lesson planning tool might be of help. Previous reports introduced some tools either in the planning or evaluation of teacher instruction:

Keller (1999, 2000) introduced the learning motivation planning (the ARCS model approach) into lesson planning process for literacy instruction in Tier One instruction. The ARCS model is based on a synthesis of motivational concepts and characteristics into four categories of Attention (A), Relevance (R), Confidence(C), and Satisfaction (S). These four categories represent the necessary components in facilitating student classroom engagement in Tier One instruction. Based on the author, the model contains a ten-step design process for the development of motivational systems in work and learning settings, including obtain course information, obtain audience information, analyze audience, analyze existing materials, list objectives, list potential tactics, select and design tactics, integrate with instruction, select and develop materials, and evaluation and revise.

Nobel (2004) reported a planning tool integrating the revised Bloom's Taxonomy with multiple intelligences for curriculum differentiation in elementary special education classrooms. As introduced, multiple intelligences (MI) theory proposed the framework that different students have different strengths and learn in different ways. In addition, the revised Bloom's taxonomy of educational objectives in the cognitive domain (RBT) provides a complexity hierarchy that from simple remembering to higher order thinking skills. With the MI/RBT matrix (an integration of MI and RBT as the model for lesson planning), teachers design learning activities

and questions that range from simple to complex thinking so that their students could demonstrate what they understood at the same or different levels of cognitive complexity.

T-TIP (the Tier Three Adolescent Reading Instructional Planning Tool) is a recently published planning tool for adolescent Tier Three reading instruction (Wilson et al., 2013). The theory behind the tool is from Kamil (2004) that an effective literacy instruction should address both reading content (what to teach) and reading pedagogy (how to teach). It is comprised of two components based on the systematic literature review: (a) reading content and (b) reading pedagogy with the suggested examples and planning questions to prompt teachers in literacy lesson planning in Tier Three settings.

However, as stated in Wilson et al., (2013), well-designed lesson planning is the first step in providing high quality instruction. Most of the aforementioned planning tools designed for literacy instruction are not investigated in real practice. Kennedy (1994) found that most teachers "lacked even rudimentary knowledge to implement an instructional development approach. It seems likely that the respondents, all highly certified teachers with lengthy experience, were resultant to admit their lack of knowledge and expertise in an area they felt they should know about"(p.20). Although some teachers show they are skillful in planning when they utilize different approaches, the gaps between lesson plan and fidelity of implementation in real instruction might exist.

Hare, Howard and Pope (2002) examined the digital technology training for preservice teachers and found that there was a gap between what they taught about technology and what they expect preservice teachers to do with technology as classroom teachers. This gap was easily observed in a group of 26 preservice teachers between the knowledge and skills preservice

teachers have through the courses, and the knowledge and skills they are expected to possess to teach in elementary classrooms.

Until now, no research studies was found to address the gap of plan and instruction in reading classrooms, leaving this critical issue unknown from school administrators and reading coaches when providing professional development for teachers in reading instruction. As a well-designed lesson plan is also based on the creativity of teachers and on their abilities in applying the lesson plan into instruction (Panasuk & Todd, 2005), close the gap between lesson plan and the implementation of instruction should arouse researchers' attentions.

**Limitations and Conclusions**

As with any literature review, the findings also contain several limitations. First, it is possible that some studies that fit into the inclusion criteria were missed by the electronic search, reference search, and hand search. The reference and hand search extended the possibilities of obtaining more relevant studies in the review; however, it does not guarantee all related studies were included in the study.

Second, given the limited studies were found in the target topic, this study was not limit to only experimental design with randomization or quasi-experimental designs, nor did it need to be quantitative studies only. Considering the quality of the research is varied, causal relationships would be inappropriate to be drawn from this literature review.

Third, studies that investigated student academic achievements toward the Tier Three instructional implementation are rare and most studies do not have valuable suggestions (such as reported effect size) toward the effectiveness of the Tier Three literacy instruction. Therefore, there is no indication that these interventions actually produced socially significant

generalization and have implications for scaling up interventions in school settings based on limited results.

And finally, considering the definition of tertiary instruction is incongruent across states and research studies, this review conceptualized the Tier Three instruction in accordance with previous studies. Other studies that published prior to 2004, although might not include the word of "Tier Three", were still included if they met the coding criteria in this systematic review. However, others who conceptualized differently on Tier Three studies may have varied findings.

Findings from this review have implications for researchers, school administrators, and special education teachers. Investigate the fidelity of implementation is necessary in tertiary instruction. It is important to observe the implementation of instruction before making decisions on the intervention. To do that, the appropriate training of fidelity of implementation should be supported by school administrators, and provide specific and timely feedback is necessary. Teachers in delivering Tier Three instruction also need to consider modeling to students how to solve problems and provide multiple opportunities for students to practice with sufficient corrective and specific feedback. Additionally, as demonstrated in bodies of reviewed research, simply reducing the group size and increasing the duration of the instruction in Tier Three settings is not enough. Teachers should also be encouraged to implement evidence-based reading programs faithfully as designed to increase student engagement and respond to the intervention. Considering the needs of struggling adolescent readers are varied, provide multi-component instruction (both word recognition and language comprehension) to meet student varied needs is important and supported by most of the research in the study.

In conclusion, this review provides a synthesis of research focused on secondary and upper elementary literacy instruction to address the problem of reading difficulties in Tier Three

settings. Findings indicate there is a continued need for Tier Three literacy instruction in high schools to be a research priority. This review extends the current literature by reviewing both student response toward intervention and teaching behaviors in implementation Tier Three interventions and examining common components for effective reading programs and interventions.

# CHAPTER III

# METHODOLOGY

The primary purpose of this research is to investigate the effect of the T-TIP (The Tier Three Instructional Planning Tool) on special education teachers' instructional behaviors; specifically in their provision of corrective and elaborative feedback in Tier Three literacy classrooms at secondary school settings. The secondary purpose is to document the social validity (social acceptance) of the T-TIP in secondary school settings. A single-subject AB multiple-baseline design across subjects is utilized to investigate the effectiveness of T-TIP planning tool on teacher lesson planning, with a focus on corrective and elaborative feedback within Tier Three literacy instructional settings in secondary schools. The research design is illustrated in the logical model of Appendix I. Given the purposes of this study, this proposal is organized from the introduction of current problems in secondary literacy instruction and problems in teaching behaviors at Tier Three. The background of T-TIP planning tool, such as prompting evidence-based reading pedagogy (corrective and elaborative feedback) to improve literacy instruction, following the methodology, planned data analysis, as well as the possible limitations of this study are discussed and described.

## Purpose of the Study and Research Questions

To address the current gaps in the literature on struggling adolescent readers and Tier Three instruction, this study targets the T-TIP prompt, focusing on the pedagogy of providing corrective and elaborative feedback at secondary schools to investigate its effectiveness and fidelity of instruction at Tier Three classrooms. The specific research questions for this study are as follows:

- Is there a specific functional relationship between teacher lesson planning with T-TIP prompt and teaching behaviors?
- Do participating educators consider targeted T-TIP lesson prompt as socially valid for increasing the use of specific reading pedagogy?

## Methods and Procedures

### Research Design

Given the nature of the research questions and the specificity of the population (special education teachers) and the settings (self-contained Tier Three classrooms), it is necessary to maintain a flexible design of the study. As described in Horner and colleagues (2005), single-subject research has proven particular relevant for defining educational practices at the level of the individual learners in special education, because "single-subject research documents experimental control, it is an approach, like randomized control-group designs, that can be used to establish evidence-based practices" (Shavelson & Towne, 2002). Additionally, single-subject research multiple baseline designs can be especially beneficial for literacy research as this type of design can accommodate new techniques and strategies and examine the effectiveness in the area of teaching reading (Barger-Anderson et al., 2004; Gay & Airasian, 2000).

This study utilizes an AB multiple-baseline across subjects design with follow-up. This design allows for comparison between baseline and intervention conditions to demonstrate a functional relationship, while controlling for the internal validity (such as interaction effect, history, and instrumentation; Kazdin, 2011). In addition, the follow-up phase in the multiple-baseline design provides substantive information to determine if there is any maintenance of evidence-based instruction after the T-TIP planning tool is withdrawn.

### Independent and Dependent Variables

*Independent Variable*: The independent variable in this study is the implementation of the T-TIP prompt, specifically the prompt that address corrective and elaborative feedback, in Tier Three lesson planning by special education teachers in self-contained resources room settings.

*Dependent Variables*: Based on the purpose of the study, the dependent variables of this study is the frequency (rate) of teaching behaviors on a priori reading pedagogy- providing corrective and elaborative feedback after implementing IV. As defined by Wilson, Faggella-Luby, and Wei (2013), corrective and elaborative feedback can be demonstrated when teachers provide specific or informative corrections, error analysis, instructive feedback, explanatory feedback, monitoring feedback, reteach, and/or establish goals for future performances. Appendix D shows specific types, examples, and non-examples of corrective and elaborative feedback that is the basis for measuring the dependent variable.

Another dependent variable is Social Validity of the T-TIP prompt. In this study, social validity is defined as the acceptance and usability toward the T-TIP prompts. Prior studies show that teachers' perspectives regarding the social relevance, feasibility, and acceptability of the intervention, such as the helpfulness of T-TIP prompt, the ease of administering the prompt, and the overall satisfaction with and commitment to use the prompt in the future teaching (Vasquez III & Slocum, 2012). Social Validity is measured with the satisfaction survey (see Appendix G for more description of this researcher-created tool) and all teaching behaviors was measured by observational tool (Appendix B) in accordance with the tool developed by Faggella-Luby, Wei, and McLarn (in preparation) based on a systematic review of literature in adolescent literacy.

**Participants**

Three special education teachers (Table 6) from two secondary schools were included in the study. We used purposive sampling procedures (Miles & Huberman, 1994) to identify

Table 6

*Teacher Demographics*

| Teacher | Gender | # Years Teaching | # Years teaching students with disabilities | Highest Degree | Method of certification | Gen Ed certificate | Special Ed certificate | Other certificate | How many students in the class? | Grade | Ethnicity | Primary Disability |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T1 | F | 32 | 32 | Master's | 4 years University | NA | k-12 | NA | 12 | 9-12 | 1 African American<br>2 Hispanic<br>9 White | 4 ID<br>1 EBD<br>1 ADHD<br>6 SLD |
| T2 | F | 17 | 17 | Master's | 4 year University | NA | k-12 | NA | 11 | 12 | 3 Hispanic<br>8 White | 3 OHI<br>3 OHI/ADHD<br>4 SI<br>1 Autism |
| T3 | F | 4 | 4 | Master's | 4 year University | NA | k-12 | NA | 12 | 9 | 6 White<br>3 Hispanic<br>3 African American | 3 EBD<br>3 OHI-ADD/ADHD<br>6 LD |

*Note*. ID=Intellectual Disabilities; EBD= Emotional Behavioral Disturbance; ADHD= Attention Disorder/Hypoactive Disorders; OHI= Other Health impairment; LD=Learning Disabilities; SI= Speech/language Impairment

participants according to the following criteria: (a) participants should be in-service special education teachers, (b) participants are sampled from the school that aligned with a proportion of students with the ethnicity, SES, and disability diversity, and (c) participants should provide reading instruction to struggling students in self-contained and/or resource Tier Three classrooms.

To recruit teachers (Appendix H) in the study, the researcher emailed districts and schools that are affiliated with the Center for Behavioral Education and Research's (CBER) research collaborative and /or those who agreed to participate in Scaling-up EnvisionIT project (Ohio State University, 2014), which is a curriculum intervention study currently underway in three Connecticut high schools. In addition, the researcher visited school principals and teachers in person to explain the purposes, obligations, benefits, and potential risks of the study and bring consent form approved by IRB from University of Connecticut to teachers. Teachers who were interested in the study were asked to sign and return their written permission for participation.

**Setting**

The study took place in Tier Three instructional classrooms (self-contained classrooms) at two secondary schools in Connecticut, ensuring representation of the observational tool in a similar learning context. Classroom desks, chairs, a side-by-side whiteboard, and quiet environment were arranged in observed classrooms. In lacking of enough resources in school district, the group size in the observed self-contained classrooms was 8 to 12 students with one special education teacher in instruction.

**Materials**

*The Tier Three Adolescent Reading Instructional Planning Tool (T-TIP).* The Tier Three planning prompt is a revised version of an evidence-based tool (Wilson, Faggella-Luby, & Wei, 2013) and was designed to facilitate teacher instructional planning and classroom evaluation in

Tier Three classrooms. This study focuses on evidence-based reading pedagogy typically represented in literacy instruction. The examples and planning questions (Appendix A) for the specific category of feedback was developed to assist the understanding of the tool. In addition, the Graphic Organizer is designed to instruct the steps of the implementation of the tool while planning and observation of instruction.

**Measurement Instruments**

*Observational Tool.* The Observational Tool (Appendix B) is an observational checklist designed to record teachers' reading instruction at secondary schools. It is a research-designed instructional behavior observation checklist to systematically catalogue how reading teachers engage in research-based instructional behaviors. On the basis of the VISIBLE observational checklist (Faggella-Luby, Wei & McLarn, in preparation) and the observational checklist created by Simonsen and Freeman (in preparation), the frequency of targeted teaching behaviors was recorded during the study by trained data collectors on the Observational Tool. Two foci in the tool are drawn from the literature reviews: (1) components of reading comprehension instruction and (2) component of teaching pedagogy (Edmonds & Briggs, 2003; Swanson & Vaughn, 2010). To accommodate our purpose of the study, the category of feedback was the focus in the component of teaching pedagogy and the operational definition (provide extensive and elaborative feedback toward students' reading performances) was provided in details in Appendix D.

*Fidelity Measurements.* Two measures were utilized for the fidelity of observation and assessment administration in the study: the Fidelity Checklist and the Fidelity of Self-rating Questionnaire. The Fidelity Checklist (Appendix E) contains the specific components of the training, observation, behavior coding, and data analysis. The purpose of the Fidelity Checklist is

to record the steps and process of the implementation of the tool, indicating whether or not the researcher and observers follow the guidelines of the study. The Fidelity Checklist is developed by the researcher and records each step the takes during the training sessions.

The *Fidelity of Self-rating Questionnaire* **(Appendix F)** is designed on the basis of Rickards-Schlichting (2008). Each participating teacher was asked to complete their self-rating checklist after each class to document if they delivered the instruction with the tool faithfully, appropriately, and efficiently. Typical components in the questionnaire include the scale of fidelity of using T-TIP while lesson planning (1-5), scale of implementation of instruction as designed (1-5), and scale of each priority categories (1-5). The Self-rating Questionnaire was collected by observers every Friday after observation.

*Satisfaction Survey*. To evaluate the satisfaction with the tool by the end of the study, a validity measure was administered to participating teachers. The Satisfaction with Instruction survey (**Appendix G**), designed on the work of Vasquez III & Slocum (2012), measures teacher satisfaction with and perception of the intervention with T-TIP and its components as the guidance of planning and evaluation of the instruction. Questions relate to how helpful instruction is with regard to the students' understanding of the content in T-TIP lesson planning, how easy it is to implement the T-TIP, the rate of effectiveness with the tool in instructional planning, as well as the overall satisfaction of the tool. A 5-point Likert scale ranging from 1 (Very dissatisfied) to 5 (Very satisfied) was administered. Finally, the teachers were asked to comment on the training and its effects.

**Procedures**

**Pre-baseline.** After IRB approval and permission was obtained from school principal, selection of participants was based on staff volunteering and written consent form was obtained

ahead before the study begins. Given students in the participating teachers' classroom were not the primary participants in the study and the only focus of this study was on teachers' teaching instruction, parental permission was not be needed.

All sessions were audio recorded to increase reliability of data analyses. Observations of intervention are designed to collect information regarding participants' adherence and competence in using interventions to improve their teaching behaviors. However, in Vivo observational methods (e.g., observers present at the intervention session and code teaching behaviors) can be costly, labor intensive, and problematic in feasibility due to scheduling or geographic location (Breitenstein et al., 2010). In addition, the in vivo observation requires extensive training on data collection and coding, approximately 15 to 40 hours per coder (Dumas, Lynch, Laughnlin, Smith & Prinz, 2001). Practitioners' reactivity to in vivo observation is also different and can change implementation fidelity—some may struggle with the interruption and become anxious about being observed (Breitenstein et al., 2010).

To address limitations described above, audio recordings of intervention sessions provide the opportunity to "assess reliability among fidelity raters, rate randomly selected portions of the intervention to evaluate ongoing fidelity, and reexamine intervention sessions multiple times" (Breitenstein et al., 2010, p.168). In addition, audio recording is less expensive, and more feasible and affordable than in vivo observations (Gardner, 2000). Obtaining audio recorded samples is more convenient and less expensive than observations because it does not need coders' coordination and the scheduling of audio recordings can be more flexible. Audio recording can be less intrusive and reduce potential reactivity effects of being observed than in vivo data collection. Furthermore, audio recording allows for the evaluation of both adherence and

competence in implementation of intervention because the audio recording provides both what the practitioner says and how it is said (Dumas et al., 2001).

In this study, the researcher provided digital audio recorders to participating teachers to capture the teaching behaviors and to avoid interfering with instruction. Based on the work of Hawkins and Heflin (2011) steps were taken to acclimate the participating teachers and students in the classroom, the digital audio recorder was given to teachers a week ahead of time prior to the baseline phase for practicing to ensure data during baseline and subsequent phases are obtained through unobtrusive observations. The researcher left the digital audio recorder with teachers and asked teachers to upload their audio recordings on a daily basis to a shared cloud server (e.g., Google Drive).

In the pre-baseline phrase, the researcher worked with school technological staff to install Dropbox on each participant's computer. If Dropbox is blocked at school, the researcher asked for permission to install Google Drive on teachers' school computer. Each participant maintained a private folder on Dropbox or Google Drive. This folder was only shared with the researcher and the individual participant. To make sure the digital audio recorders was appropriately installed and data was appropriately uploaded, the researcher visited the school(s) once per week based on participant's availability to solve any technical problems that participants encountered.

To make timely decisions and ensure participants enter intervention when data decision rules are satisfied, the researcher sent weekly email reminders (e.g., every Monday morning) to participants about uploading their audio recordings to shared Google Drive folder after class. The researcher monitored the data every day and reminded the participants through email if the audio recording data had not been entered after 3pm. If participants experienced difficulties in

electronically uploading to the Google Drive folder, they had the option to notify the researcher via email or phone immediately.

*Observational Training Process*. Data was collected by two trained data collectors (a researcher and a graduate student in education) using frequency or (rate) with which the participants deliver specific correction, informative corrections, error analysis, instructive feedback, explanatory feedback, monitoring feedback, repeat, and establish goals for future performances. Frequency is a commonly used method for the recording of teaching behaviors in educational observational research (Chafouleas, Riley-Tillman & Sugai, 2007). We also captured whether there was on-going feedback at the end of each minute to record the latency of providing corrective and elaborative feedback in Tier Three instruction. Additionally, the frequency (or rate) of each types of corrective and elaborative feedback was recorded. Rate of each feedback was calculated as the total counts of each types of corrective and elaborative feedback divided by the number of minutes recorded. Teaching behaviors were recorded every 1 minute for the estimation of the percentage of the instructional time.

Each rating was planned for 20 minutes of the scheduled classes. The rater used one data-collection sheet per class period, a clipboard, pen and timer. A digital 1-minute automatically repeating visual timer was used indicating sampling intervals. Time sampling begins when the instruction starts on the audio recorder. Every 1 minute, the rater listened to teacher's instruction and recorded a component of reading comprehension instruction if occurring and the frequency of instructional pedagogy (corrective and elaborative feedback) the teacher is delivering. The timer automatically began counting down at the end of each interval, allowing the process to repeat until the coding process stopped.

Observers used the observational tool for typical teaching behavioral observation. To ensure the accuracy of behavioral observation, data collectors use the operational definitions presented in **Appendix E** to guide through the coding process. For the observation of reliability: one serves as the primary data collector and the second as the inter-observer agreement data collector in 25% of the observed instruction. To ensure the reliability of the observation, observers were trained on data collection procedures. First, observers were trained to master the operational definitions for each category of reading comprehension components and teaching pedagogy. Next, observers practiced data collection and calculated inter-rater reliability (percentage agreement) by using the observation tool with publically available and previous recorded video/audios of teachers not participated in the study. Observers continued practice until they achieved 90 percent agreement.

**Baseline Phase**. During baseline, participating teachers were asked to observe their typical teaching behaviors without any assistive tools/professional development provided (e.g., do what he/she normally would do during the baseline phase). Audio recording occured three to five times per week (approximately 18-50 minutes per time) depending on the classroom calendar.

As the multiple-baseline was applied, for each participant, the baseline audio recording and the start of the intervention (T-TIP) implementation was varied: the first teacher was anticipated to record at least a week (3-5 data points) until performance is stable (i.e., 3-5 data points within 5 differences of each other as the guideline) of critical teaching behaviors; the second teacher was recorded two weeks (8-10 data points) based on the duration of stable performance; the third teacher was expected to record three weeks (11-15 data points) for the purpose of establishing stable performance before intervention. Given three teachers were

observed throughout the study, it was anticipated that a total of 6 to 15 data points within four weeks was obtained during the baseline collection phase.

Data from audio recording were then analyzed daily in a timely manner by the researcher and the co-rater to obtain baseline rates of the dependent variables. Typically, the researcher monitored daily whether the audio recordings had been uploaded to the shared Google Drive file. The research team reviewed data points every day so that the timely decisions could be made, for example, ensure the participants enter intervention when data decision rules are satisfied. When adequate stable baseline data is established, the intervention phase began. As defined in Kazdin (2011) and WWC (2010), the adequate data in single-subject design studies was at least 3 to 5 data points in each phase. The stability of data collection is conceptualized as absence of trend in the direction of the expected change and lack of extreme variability around the mean (Horner et al., 2005; Kazdin, 2011).

Once a baseline has been established, the training on the T-TIP prompt was applied to one of the participating teachers. During this time, baseline was maintained for the other participants. Once improvement was seen in the first participant, the training on T-TIP started with the second participant, and so on.

***Intervention Phase***. Given the purpose of the study (investigation of the T-TIP effectiveness at the Tier Three instruction), the general settings were in the self-contained rooms. Once a stable baseline was established, the researcher provided the trainings to participating teachers at different time periods (e.g., we started with teacher two while continuing baseline observation of the other teachers). The training took place individually at resource room for the use of the planning tool (T-TIP) in instructional planning. Each training took about 50-60

minutes and included two primary components: (a) initial introduction of T-TIP prompt and specific teaching pedagogy, and (b) collaborative planning and observation with feedback.

To teach participating teachers how to use the T-TIP, the trainer faithfully followed the instructional protocols on the fidelity checklist as the guidance in the process of training. The instructional protocol includes the following steps: (a) describe the planning tool, (b) demonstrate/model the use of the tool, (c) provide guided practice of the T-TIP steps, (d) provide practice implementing the tool in controlled contexts, and (e) complete the training and solicit the teachers' commitment to long-term implementation of the tool in instructional planning.

The training introduction targeted demonstration of the tool and modeling of the operational definitions of targeted teaching pedagogy in T-TIP prompt. The specific component of the tool (providing corrective and elaborative feedback) together with operational definition of the component was provided at the beginning of the training. The training provided the teachers with an overview of intervention procedures and the graphic organizer with the steps of T-TIP implementation further facilitated teachers' understandings of the tool. After the T-TIP prompt was introduced, a scenario together with an example of lesson plan on T-TIP prompt was provided as an overall big picture of how to use the tool. In this process, teachers engaged in a cooperative team work with the trainer and use the T-TIP as the guidance on lesson planning. The trainer first demonstrated and modeled the T-TIP prompt in lesson planning with the scenario. Participating teachers in this process were then required to practice the planning prompt under the guidance. The trainer closely monitored teacher reactions and provided extensive feedback on teacher performance and lesson planning with the T-TIP.

On observation with feedback, this process was followed by immediate feedback using the T-TIP prompt during the observation and training. The teacher lesson planning process was

observed and the trainer provided feedback and discussion regarding (a) items checked/not checked on the T-TIP prompt, (b) review of examples of teacher's use of the tool, (c) reflection on the lesson planning with T-TIP prompt, and (d) joint planning with T-TIP prompt for next time. During the training process, the trainer answered all questions proposed by the participant to make sure the participant leave without any confusion.

Once the training was completed and teachers mastered the T-TIP, participating teachers was asked to design and deliver their instruction with the T-TIP independently. Audio recording toward fidelity occurred at Tier Three settings three to five times per week approximate 20 minutes per day of observation for each teacher. The intervention observation lasted approximately 3-6 weeks (ranged 2 weeks across teachers), varying for each teacher depending on how long it took her to reach stable data on the tool. Instruction was delivered with consideration given to the principles of the tool: the content of instruction and the pedagogy (providing feedback) of the instruction. Consistent with the multiple-baseline design, when T-TIP planning tool was initiated for participant One, the other teachers remained in baseline until participant One demonstrated a distinct pattern of data. For example, at least 4 data points showed a change in slope and at least 75% of the data points exceeding those from the same participant in the baseline phase (Vasquez & Slocum, 2012). When a distinct pattern of data was obtained, a second participant was considered for intervention.

After each audio recording, the audio recording data, teacher T-TIP lesson prompts, together with fidelity of self-rating questionnaires were required to submit to the researcher every time participants finished teaching class. If unexpected technical problems occurred, participants contacted the researcher immediately and the data was collected at school when the researcher was on-site.

To document the effectiveness and fidelity of instruction, during the Instructional period, two trained observers captured the pedagogy of providing corrective and elaborative feedback occurring at the audio recording daily. Additionally, teachers were asked to answer the Satisfaction Survey after the whole intervention phase is completed.

***Maintenance Phase***. Maintenance assessment occurred at least twice per month for each participant following the completion of the intervention. The teachers were encouraged to continue using the T-TIP prompt as identical to the intervention phase and the observers observed the fidelity of implementation and teaching behaviors twice. The maintenance phase took place approximately in two weeks after the completion of the intervention. The Satisfaction survey was given to teachers to obtain the social validity, usefulness, and feasibility of the planning tool. Depending on the teacher, 8-12 weeks were needed to complete the sequence of baseline, intervention, and maintenance conditions across teachers.

***Inter-rater Reliability***. Audio recording was collected by trained data collectors using frequency counts**.** Based on the work of Hawkins and Heflin (2011), the researcher collaborated with the second observer and trained the second observer on recognition of the dependent variables and the data collection procedures. Training took place during the pre-baseline phase. The researcher reviewed the operational definitions of the dependent variable with the second observer in advance of practice observations. Both the researcher and second observer practiced collecting frequency data for a set number of observations during the pre-baseline phase. Based on the observational arrangement, observers used observational tool for typical teaching behavioral observation. Interscorer reliability was determined by having two scorers independently score a random sample (a minimum of 25%) of each of the group at each point in the data-gathering observation of each group (Kazdin, 2011). The inter-rater reliability of audio

observation was conducted at least once per week. Each of the two coders listens to the same session of the participants' instruction and completes the measure. The frequency of teaching behaviors of the experimenter was compared with the primary observers' coding for the same participant from the same session. Inter-rater reliability was calculated as the estimation of the effectiveness of the T-TIP implementation. The percentage of inter-observer agreement was calculated with the formula: Percent Reliability = (Sum of agreement/ (number of agreement + disagreement) x 100.

Interrater agreement (Table 7) was collected among 25% of the audio recordings. Scoring for interrater agreement was conducted for each phase of the present study (baseline, intervention, and maintenance phases) to determine the accuracy of the teachers' responses. Overall agreement was calculated at 98% (ranged 93% - 100%) for the baseline phase, and 88% (ranged 72% -100 %) for the intervention phase, and 87.5% for the maintenance phase (ranged from 85%-90%).

Table 7

*Inter-rater Reliability*

| | Percent Agreement | | | |
|---|---|---|---|---|
| Participant | Baseline | Intervention | Maintenance | Overall % |
| Teacher 1 | 98.75 | 89.58 | NA | 94.17 |
| Teacher 2 | 100.00 | 91.25 | 90.00 | 93.75 |
| Teacher 3 | 97.97 | 84.10 | 85.00 | 89.02 |
| Overall % | 98.00 | 88.00 | 87.50 | |

*Note*. This table provides a summary of percent agreement for each participant on providing feedback as well as overall percent agreement for the entire observation. NA is provided in the table for Teacher 1 as the interrater reliability of Teacher 1 in maintenance condition is not calculated.

***Social Validation***. To ensure that the planned prompt is socially valid, qualitative data also was analyzed for teacher attitudes toward planning prompt and its effectiveness in improving teacher lesson planning. In this study, the social validity survey (satisfaction survey in Appendix G) is derived from the survey of Vasquez III and Slocum (2012) that includes questions with responses on a 5- point Likert Scale. The social validity survey was administered at the conclusion of the intervention.

**Potential Threats to Reliability and Validity**

As a single-subject multiple baseline design, this study potentially included some limitations with unpredictable threats.

First, in regards to construct validity, there was a potential threat about the inadequate explication of constructs in the observation. Although different research studies designed observational tools for the observation in accordance with varied goals, no typical observational tool that is generally considered to more reliable and valid than others. This study adopted an observational tool that was typically designed to observe teaching behaviors at Tier One literacy instruction. Until now, no observational tool has yet found to be effective in observing teaching behaviors at their Tier Three literacy instruction in secondary schools.

Second, observer bias might be a threat to validity and reliability. Observer bias may occur when expectations and knowledge that observers have about participants influence the decoding of the observation (Hartmann & Wood, 1990). This threat is of particular concern when recordings of similar behavior and events are part of the study design, as the bias threat could potentially be further compounded (Baer et al., 2005; Swanson, 2008). Therefore, to reduce this potential bias effect, two observers coded the recordings and interrater reliability was calculated to check the work every week.

Third, as is typical in single-subject design research, the use of visual analysis as the primary basis for evaluating the data raises the concern that no concrete decision rules for determining whether a particular data demonstrated the reliable effects or not (Kadzin, 2011). In addition, there are several factors contribute to judgements about the data in visual inspection. The joints effects of each component and how they are integrated to reach decision is not clear (Kadzin, 2011). Therefore, careful analysis of the visual analysis is needed in consideration of its effects and integrate the analysis of variability, trend, levels, as well consistency of the data.

**Data Analysis**

This project employed multiple baseline design. Three stages were applied for the analysis of SCD data: (a) examining the changes in level, immediacy, variability, and trend through visual analysis; (b) effect size calculation; and (c) fidelity of implementation calculation. The changes in level is to compare the level of the data during the baseline phase with the level of the data in the intervention phase, as well as to consider the impact of a single-deviant data point (outlier) on the mean (Riley-Tillman & Burns, 2009). The changes in immediacy refers to the amount of time for the intervention to have an impact on the teaching behavior, meaning, comparing the changes and overlaps between the last three data points in baseline and the first three data points in intervention phases. Variability refers to the amount of variation in range and consistency in a set of data within and between phases (Riley-Tillman & Burns, 2009). And the change in trend is considered to be critical in the outcome data. The trend is the rate of change within a phase, demonstrating the data is increasing, decreasing, or remaining stable over time (Riley-Tillman & Burns, 2009).

The study presented a table (Table 6) to display the participants' demographics and descriptive information and information about the observations. Given visual analysis (Line

Graphs) allows observers to determine if there is any relationship between independent variable (T-TIP in lesson planning) and dependent variable (teaching pedagogical instruction), data from the baseline, intervention, and maintenance phases was graphed and visually investigated for changes in trend, slope, and level (Binger et al., 2008). The trend, direction, level, stability and variability of the data series was calculated within each phase. Between each phase, the changes in these features along with the absolute mean change was determined.

Effect size was also calculated using the percentage of non-overlapping data points (PND) (Parker et al., 2007; Scruggs, Mastropieri, & Casto, 1987). The percentage of non-overlapping data (PND) points (the percentage of points during the intervention phase that exceeded the highest point during baseline) was calculated to measure the effectiveness of the intervention (Scruggs & Mastropieri, 1998). Scruggs and Mastropieri (1998) recommended a PND of at least 80% for a large effect. PND was calculated by the following formula from Kazdin (2011) : PND= (# of data points in the treatment phase which exceed the highest data point in the previous baseline phase / Total # of data points in the treatment phase) X 100. To answer question 2 (the social validity of the planning tool), descriptive results was summarized from rating scale (satisfaction survey).

The fidelity of the T-TIP intervention was assessed every time when each teacher delivers the instruction during the course of the intervention. Both Lesson prompt and Fidelity of Self-rating Questionnaires were collected and analyzed after the instruction. On average, intervention fidelity ratings during intervention phase were 96% (range= 88%-100%) for all teachers. The results indicate that for Teacher 1and Teacher 2, the T-TIP lesson prompt was implemented with complete fidelity at each of the fidelity probes. Teacher 3's fidelity data

indicated there were two probes when the teacher did not check in and filled out the lesson plan and self-rating questionnaire as required.

*T-TIP Lesson Prompt*. Teachers used the T-TIP lesson prompt in the process of lesson planning. The T-TIP prompt was collected every time after teachers finished their literacy instruction. The records on the T-TIP lesson prompt revealed that all teachers implemented the instruction with levels of treatment integrity. On average, Teacher 1 planned the lesson with T-TIP prompt with 100% fidelity; Teacher 2 used the prompt with 100% fidelity; whereas Teacher 3 used the T-TIP lesson prompts with 88% fidelity.

*Fidelity of Implementation Questionnaire*. In the Fidelity of Implementation Questionnaire, five questions were asked to indicate teachers' use of the T-TIP in the process of lesson planning and literacy instruction. Teachers were required to fill out the questionnaire every time they finished the lesson with 1 (strongly disagree) to 5 (strongly agree). Results (Table 8) showed that on average, teachers agreed ($M$=4.55) to use T-TIP prompt in their lesson planning. They agreed they implemented the reading instruction as designed/planned ($M$=4.19). In addition, they delivered the reading components faithfully based on their lesson plan ($M$=4.16) and generally provided opportunities for corrective and elaborative feedback as planned in their lesson ($M$=4.24). The overall rating of the instruction with the planning prompt for each teacher was 4 (satisfied).

Table 8

*Mean Ratings on Self-rating Questionnaire*

| **Mean** | Q1: I used T-TIP prompt in my lesson plan. | Q2: I implemented the reading instruction as designed/planned. | Q3: I delivered the reading components faithfully based on my lesson plan. | Q4: I implemented the following reading pedagogy as planned in this lesson. | Q5: overall rating of my instruction with the planning prompt today. |
|---|---|---|---|---|---|
| Teacher 1 | 4.75 | 4.5 | 4.5 | 4.75 | 4.5 |
| Teacher 2 | 3.91 | 4 | 3.91 | 3.91 | 4.09 |
| Teacher 3 | 5 | 4.07 | 4.07 | 4.07 | 4 |
| Total Average | 4.55 | 4.19 | 4.16 | 4.24 | 4.20 |

*Note*. This self-rating questionnaire adopted a 5-rating Likert Scale with 1=Strongly disagree; 2= Disagree; 3= Neither agree nor disagree; 4= Agree; 5= Strongly agree.

# CHAPTER IV

# RESULTS

In this chapter, findings of the current study are reported. Specifically, these findings are a result of the single-subject study that took place during the literacy instruction provided in three secondary self-contained classrooms. The methodology consisted of a multiple baseline design with the dependent variable collected during baseline, intervention, and maintenance conditions.

Data are presented in the graph. Figure 1 displays the rate of providing corrective and elaborative feedback to students with disabilities in self-contained classrooms, including (a) a Y axis representing the rate of overall corrective and elaborative feedback provided per minute, (b) an X axis representing the times of observation, and (c) data points representing teaching behaviors (providing corrective and elaborative feedback) on each observation. As noticed in Figure 1, three teachers have varied observational sessions across phases. Compared to Teacher 2 and Teacher 1 who came from the same school with the same block schedule (teach the class once every other day), Teacher 3 has the different schedule with the same class taught every day.

In the following sections, research questions are addressed through descriptive, statistical, and visual analysis. To understand the specific components for the effectiveness of the intervention, additional findings addressing the types of feedback observed in the study, the gaps between lesson plan and implementation of instruction, as well as the observed reading content will be reported. These findings are considered additional, as they do not directly address the research questions, yet do provide useful information for future studies.

FIGURE 1

*MB Graph for T-TIP*

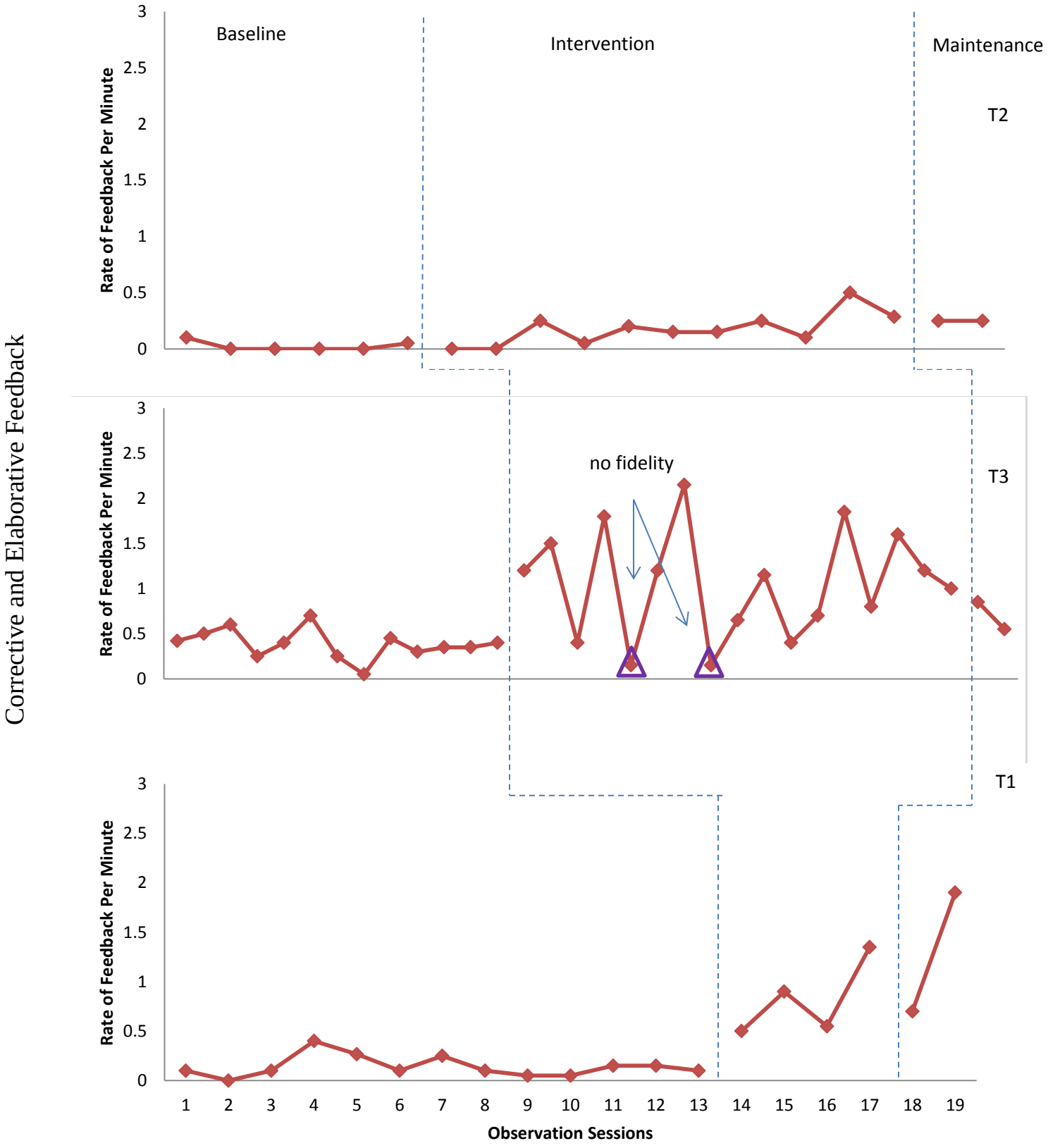



Figure 1. Rate of corrective and elaborative feedback for Teacher 1 (T1), Teacher 2 (T2), and Teacher 3 (T3)

## Impact of T-TIP on Teacher Behaviors

Research Question 1: Is there a specific functional relationship between teacher lesson planning with the T-TIP prompt and teaching behaviors (providing corrective and elaborative feedback)?

Overall, all participants displayed low levels of providing corrective and elaborative feedback during the baseline condition. When the intervention was in place, the behavior of providing feedback improved. The results of the baseline, intervention, and maintenance phases are described in the following section in details to determine the existence of a functional relationship.

### Baseline

In general, the baseline data documented a pattern of behavior in need of change across three participants with sufficiently consistent level, trend, and variability. In addition, two participants revealed sufficient demonstration of a clearly predictable baseline pattern of responding that can be used to assess the effects of the targeted intervention.

**Teacher 2.** Baseline means for corrective and elaborative feedback are presented in Table 9 and ranged from 0.00 to 0.39 per minutes of instruction. As indicated by the initial baseline means, Teacher 2 achieved a baseline mean score of 0.03 per minute with overall corrective and elaborative feedback. Specifically, 0.01 on specific correction, 0.00 on informative correction, 0.00 on error analysis, 0.00 on explanatory correction was observed in the baseline phase.

Table 9

*Performance of C/E Feedback across Phases*

| Condition | Teacher 1 | Teacher 2 | Teacher 3 |
|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| | Mean | 0.14 | 0.03 | 0.39 |
| Baseline | Last Three Data Average | 0.13 | 0.02 | 0.37 |
| | Median | 0.10 | 0.00 | 0.40 |
| | Mean | 0.83 | 0.18 | 1.05 |
| Intervention | Last Three Data Average | 0.65 | 0.08 | 1.03 |
| | Median | 0.73 | 0.15 | 1.15 |
| Maintenance | Mean | 1.30 | 0.25 | 0.70 |
| Overall | PND | 1.00 | 0.63 | 0.65 |

*Note*. PND is percentage of non-overlapping data= (# of data points in the treatment phase which exceed the highest data point in the previous baseline phase / Total # of data points in the treatment phase).

Regarding the baseline trend, the data in Figure 1 demonstrate a baseline phase across three participants. Teacher 2 had 6 sessions in the baseline condition, with an average of 4 sessions (67%) with no corrective and elaborative feedback provided in the baseline. The rate range of providing corrective and elaborative feedback is from 0.00 to 0.1 per minute with a decreasing trend across the phase and the last three data points averaging 0.17 corrective and elaborative feedback were provided per minute. The data provide a clear pattern of responding that would be in need of change; if left unaddressed, it would be expected to continue in the 0.00 to 0.17 per minute range in her targeted teaching behavior.

Furthermore, the increased stability in rate of providing corrective and elaborative feedback across the baseline is important to note, as marked instability of behavior is common among special education teachers in self-contained classroom instruction. Teacher 2 displayed corrective and elaborative feedback in 0.03 per minute of baseline sessions (range = 0.00 to 0.05, see Figure 1), therefore, the baseline data is relatively stable with low variability across the phase.

**Teacher 3.** Teacher 3 provided a higher rate (0.39 per minute) of corrective and elaborative feedback compared to other two teachers. However, the average rates on error analysis, reteaching, and goal setting are extremely low (0.00 across the phase). Compared to teacher 2 in baseline trend, teacher 3 had a higher rate in target behavior in the baseline phase. Teacher 3 had 13 sessions in the baseline, with an average of 10 sessions (77%) with less than 0.5 corrective and elaborative feedback provided per minute. The rate of providing corrective and elaborative feedback is from 0.05 to 0.7 per minute with a trend of below 0.5 per minute across the phase and the last three data points is considerably stable compared to other baseline data (averaging 0.37 feedback per minute). If no intervention occurred, it is predicted the trend would continue in the 0.05 to 0.37 per minute range in the target behavior. Regarding the baseline variability, Teacher 3 documented corrective and elaborative feedback in 0.39 per minute in the baseline (range = 0.05 to 0.70). But the data in the baseline mostly was between 0.25 to 0.50 per minute, especially the last five data points demonstrated a sufficient consistent variability (range = 0.30 to 0.45) that document a pattern of behavior in need of change.

**Teacher 1.** Teacher 1 used some amount of corrective and elaborative feedback; however, the rate was still low with the average of 0.14 per minute. Specifically, 0.02 on specific correction, 0.03 on informative correction, 0.05 on error analysis, and 0.04 on instructive feedback was observed. Teacher 1 had 13 sessions of the baseline, with an average of 13 sessions (100%) less than 0.5 corrective and elaborative feedback provided during the baseline phase. For teacher 1, as she has the longest baseline over time, the rate of providing corrective and elaborative feedback is around 0.00 to 0.4 per minute with a stable trend of below 0.15 per minute across the phase. The last six data points in the baseline stage are also considerably stable compared to other data points in the same stage, with an average of 0.13 per minute observed. If

no intervention was implemented, it is predicted the teaching behavior on providing corrective and elaborative feedback would continue in the range of 0.00 to 0.13 per minute. In addition, Teacher 1 indicated corrective and elaborative feedback in 0.14 per minute across the baseline (range = 0.05 to 0.25), with sufficiently consistent variability across the phase.

In sum, three teachers showed a stable trend and sufficiently consistent variability in the baseline condition. Their baseline data all demonstrated a predictable baseline pattern of the behavior (providing corrective and elaborative feedback) in need of change.

**Intervention**

The overall rate of the T-TIP intervention by each teacher is presented in Figure 1. As demonstrated in the Figure, all teachers mastered the T-TIP prompts of more than 70%. In addition, three teachers demonstrated improvement by showing an increase in providing corrective and elaborative feedback. Visual inspection of this figure (i.e., changes in level, trend variability, latency of change, and overlaps) was also conducted during the multiple baseline and intervention phase for all three teachers to determine if a change occurred in corrective and elaborative feedback in self-contained tier 3 classrooms and if that change could be attributed to the intervention.

**Teacher 2.** As figure 1 shows, Teacher 2 displayed some improvement in providing feedback after the implementation of the intervention. For the teacher with extremely low observed behaviors on the baseline phase, the improvement, on the other hand, is more consistent although delayed compared to other teachers with more frequent and immediate response in the intervention. Among three teachers, Teacher 2 showed the least amount of improvement by 0.15 compared to her baseline phase (0.03 per minute). The mean number during baseline and the T-TIP intervention is presented in Table 9 and substantial increases in

the mean of providing corrective and elaborative feedback were observed. During the intervention phase, the mean improved considerably from 0.03 during baseline condition to 0.18 during the intervention condition. With respect to the stability of progress, Teacher 2 showed an increase after a week of implementation of the intervention and provided 0.18 on average in the intervention phase. This trend continued throughout the intervention, with the teacher consistently mastering the intervention and the average rate of providing corrective and elaborative feedback was 0.18 compared to her baseline average (0.03). The variability of the data revealed that teacher 2 has some variability (ranging from 0.00 to 0.50 in the intervention), but the overall trend is increasing.

For Teacher 2, there are relatively few overlaps across the adjacent phases: 0.03 in baseline and 0.18 in intervention phase on average. The data within each non-baseline phase document a predictable data pattern, such as 72% across the intervention phase and the overall rate increased after the intervention was introduced. Specifically, three overlapping data points (27% on sessions 7, 8, and 15) between intervention and baseline were revealed in the graph. The between phase did reveal the basic effects as well. For example, the consistency of data in similar phases involved the consistency of all baseline phases across three participants even after the intervention was introduced to Teacher 2. However, the latency of change for Teacher 2 was observed during the study. The change in level between the last three data points in baseline phase (0.02) and the first three data points of the next intervention phase (0.08) was not obviously different. Especially, the first two data points in the intervention stayed the same (0.00) as the baseline after the intervention was introduced.

As demonstrated, the average performance on the T-TIP planning prompt increased substantially in level from the baseline to the intervention and maintained after the intervention

was completed. In fact, the mean percentage of non-overlapping data (PND) points for Teacher 2 was calculated from the baseline to the intervention phases. PND was calculated as the number of treatment data points that exceeded the highest point in the baseline in an expected direction and then divided by the total number of points in the treatment phase and multiplied by 100 (Kazdin, 2007). The PND score for overall corrective and elaborative feedback was 0.63. This reveals that the effect size of the intervention in changing teaching behavior (providing corrective and elaborative feedback) is considered to be medium. Across the phase, on average, 15% of the instructional time was spent on providing specific correction in the intervention condition , 3% on informative correction, 60% on instructive feedback, 3% on explanatory correction, 15% on monitoring feedback, and 4% on reteaching. However, no instructional time was spent on setting goals as well as error analysis for students' future performance.

Generally, an increase in providing corrective and elaborative feedback was noted from the baseline to the intervention conditions in Teacher 2's response: the graph in visual analysis reports the changes in level, trend, and variability of the data differ dramatically from phase to phase. Because the observed data in the Intervention phase is outside the observed data pattern of the baseline phase, the baseline and intervention comparison demonstrated an experimental effect in predicted changes in the dependent variable (providing corrective and elaborative feedback) when the independent variable (T-TIP lesson prompt) was actively manipulated.

**Teacher 3.** Visual analysis of figure 1 (i.e., changes in level, trend, and variability) was also conducted during the multiple baseline and intervention phase for Teacher 3 to determine if a change occurred and if the change could be explained by the intervention. From this figure, Teacher 3 demonstrated immediate improvement at the beginning of the intervention: changes in level from the end of baseline to the beginning of the intervention indicated that Teacher 3

increased her teaching behaviors in providing corrective and elaborative feedback immediately at the beginning of the intervention (from 0.37 to 1.03 per minute). As figure 1 shows, changes in level from baseline to intervention indicated that during the intervention phase, the mean improved considerably from 0.39 per minute during baseline condition to 1.05 per minute during the intervention condition. Among the three participants, teacher 3 improved the most: her mean performance increased by more than 0.66 during the intervention phase, although the slope for the data remained stable over time. The PND also reveals that the effect size for overall corrective and elaborative feedback is 0.65, that is, the intervention points that exceed the value of the highest baseline point is for a medium effect (Scruggs & Mastropieri, 1998). When providing corrective and elaborative feedback, on average, 10% of the instructional time was spent on specific correction in the intervention condition, 18% on informative correction, 49% on instructive feedback, 3% on explanatory correction, 19% on monitoring feedback, and 7% on establish goals. Additionally, little instructional time was spent on error analysis (1%), explanatory feedback (1%), and reteaching (0%).

Although the levels were distinctly different in adjacent phases, the data for Teacher 3 did not reveal any trend of the increase across the phases even after the intervention was introduced. The data within each non-baseline phase was unpredictable, especially in intervention. Teacher 3's behavior of frequency in providing feedback, which was across all targeted behaviors with the highest rate of targeted behavior of 2.15 per minute (higher than the average of the intervention) and the lowest performance of 0.15 per minute (lower than the average of the baseline). In the figure, the variability of the data revealed that the total number of providing corrective and elaborative feedback ranged from 0.05 to 0.70 during baseline and ranged from 0.15 to 2.15 during intervention condition. Therefore, Teacher 3 demonstrated the

most variability in her performance of using the T-TIP intervention for the targeted teaching behaviors. Several data points dropped to baseline performance (0.7 per minute), with 35% of her data falling in this range. For the reminder of the intervention, the teacher improved her performance of delivering corrective and elaborative feedback by mastering the T-TIP intervention, with an increasing trend as the result.

In addition, there is a relatively high overlap across adjacent phases: There are some overlaps between the data in Baseline and the data in Intervention (0.39 in baseline and 1.05 in intervention phase on average). Specifically, six overlapping data points (36% on sessions 15, 18, 21, 22, 24, and 25) between intervention and baseline were displayed in the graph. The immediacy of the effect in comparing the level, trend, and variability of the last three data points in baseline are distinctly different from the first three data points in the intervention phase. The observed effects are immediate in the level change (from 0.37 to 1.03) as well as the trend change (from stable trend to increasing trend). However, compared to the last three stable data points in baseline, the first three data points in intervention ranged from 0.40 per minute to 1.50 per minute in giving corrective and elaborative feedback.

It is also noticeable that in Figure 1 there are some outliers in the intervention on Teacher 3's behaviors. During the intervention, Teacher 3 conducted some irregular classes. For example, she implemented writing instruction and asked students to write an essay for a whole class during session 18. The other two outliers were also the result of irregular classes (session 21 and 22): the teacher rewarded students when achieving their reading goals and allowed them to watch a video for half of the class period. These irregular classes might have impacted the overall variability and change in trend across the intervention condition.

In general, considering the extreme outliers in atypical classes, the between phase basic effects demonstrate the presence of basic effect on Teacher 3. For example, Teacher 3 showed increasing level in the frequency of providing corrective and elaborative feedback in adjacent phases (0.39 in baseline and 1.05 in intervention phase on average). The PND effect size also revealed the medium effect size of the intervention (T-TIP planning prompt) on the change of the target behavior (providing corrective and elaborative feedback) in literacy instruction.

**Teacher 1.** Given the baseline trend decreased after five sessions, the intervention was introduced, resulting in an immediate increase in providing corrective and elaborative feedback. As shown in the figure, changes in level from the end of baseline to the beginning of the intervention indicated that the change in level is distinctly different between the first and last three data points in the adjacent phase. Figure 1 indicated the immediate increase of Teacher 1's performance from little corrective and elaborative feedback (0.13 on average) to 0.65 per minute in the first three data points in intervention. The overall mean improved considerably as well from 0.14 during baseline condition to 0.83 during the intervention condition. That is to say, Teacher 1 demonstrated some improvement with about 0.67 per minute compared to her baseline phase. With respect to the stability of progress, Teacher 1 increased immediate feedback after the T-TIP intervention was introduced. This trend continued throughout the intervention, with the teacher consistently mastering the intervention and the average rate of providing corrective and elaborative feedback was 0.83 compared to her baseline average (0.14). Teacher 1 also showed low variability in providing corrective and elaborative feedback after the implementation of the intervention. For example, all data points in the intervention phase exceeded the baseline performance (0.4 per minute), with 100% of her data provided. In addition, the overall trend is upward.

For Teacher 1, there is a sufficiently low overlap: the data within each non-baseline phase documented a predictable data pattern, such as 100% across the intervention phase and the rate increased after the intervention was introduced. The between phase basic effects demonstrate the presence of basic effects, such as Teacher 1 showed increasing trend in the frequency of providing specific correction with few overlaps between the baseline and intervention phases (0.14 in baseline and 0.83 in intervention phase on average). Additionally, the PND results indicated that the effect size of the overall corrective and elaborative feedback after the intervention is 1.00. In general, while the data is somewhat variable, there is no overlap between the two phases. Therefore, this is strong evidence of an intervention effect on Teacher 1.

In summary, across the study, there are three demonstrations of effect that were observed to indicate the functional relationship between the T-TIP intervention and the target teaching behavior (providing corrective and elaborative feedback). As shown in Figure 1, three teachers mastered the implementation of the T-TIP planning prompt of 70% or more. Teacher 1 and Teacher 2 consistently implemented the T-TIP lesson prompt accurately. A lower level of mastery intervention occasionally occurs for Teacher 3, as her mastery of production fell to slightly over 50% in some instruction. Phases in similar procedures also associated with consistent patterns of responding to the extent to which the data patterns with the similar phases are similar. There was no change in the baseline phase for the other two teachers when the intervention was applied in Teacher 2. This continuation of the baseline provides verification of the original baseline statement in Teacher 2. When the intervention was later applied to Teacher 3, the intervention effect is replicated thus completing the full baseline logic statement. In addition, Teacher 1 also demonstrated the verification (in the baseline of Teacher 3) and later a final replication of the intervention effect.

**Maintenance**

In the maintenance phase, teachers were asked to continue literacy instruction without using the T-TIP. The goal is a meaningful improvement after the intervention occurs and if the data pattern is still consistent when the intervention is faded.

Figure 1 illustrates that Teacher 1 and Teacher 2 provided corrective and elaborative feedback on the maintenance condition, thereby meeting the criterion. Specifically, Teacher 1 and Teacher 2 on the maintenance phase demonstrated significant improvement over the intervention scores and maintained the improvement overtime after the intervention was done. The mean performance of providing corrective and elaborative feedback was 1.30 per minute for Teacher 1, an increase of 0.48 from intervention to the maintenance condition; and the mean of 0.25 per minute for Teacher 2, an increase of 0.07 from intervention to the maintenance condition. Maintenance data for Teacher 1 (range=0.70 to 1.90) and Teacher 2 (range=0.25) indicated that intervention gains were maintained and also higher than their average scores both in the baseline and intervention phases (T1: $M$=0.14 and $M$=0.83 respectively; T2: $M$=0.03 and $M$=0.18 respectively). The data for Teacher 1 and Teacher 2 also showed a stable and increasing trend across the adjacent phases from intervention to maintenance.

However, the data for Teacher 3 were somewhat variable from .55- 0.85 and no predictable trend was demonstrated during this maintenance phase. Although the maintenance data for Teacher 3 was high (range= 0.55- 0.85), a decrease of more than 0.35 per minute was observed from her mean scores in the maintenance phase ($M$=1.05 in the intervention*)*. Teacher 3 did not maintain improved performance with the average rate of 0.7 per minute in the maintenance phase, although she did demonstrate improvement when compared to a baseline mean of 0.39.

## Social Validity

Research Question 2: Do participating educators consider targeted the T-TIP lesson prompt as socially valid for increasing the use of specific reading pedagogy?

Teachers rated their satisfaction with the training and the tool on a 5-point Likert Scale (1-very dissatisfied; 5- very satisfied). A summary of the T-TIP Acceptability Questionnaire ratings is provided in Table 10. Teacher average ratings were 4 or greater on a 5-point Likert Scale as to whether the T-TIP resulted in improved behavior, which may be related to the short amount of time in intervention prior to administering the T-TIP Acceptability Questionnaire. All teachers rated a 4 or better indicating that the T-TIP was worth the time and effort to implement the intervention during their lesson planning and implementation of the instruction. All teachers reported that the content of the training was very helpful ($M$ =4.33) and that they were more confident that they could design lessons with more corrective and elaborative feedback ($M$ = 4.67). These teachers further responded to questions regarding the effectiveness of the T-TIP and subsequent effects on implementation of instruction by using the T-TIP prompt. All teachers reported "satisfied or very satisfied" on the impact of the intervention on their lesson planning ($M$ =4.50), the progress of lesson planning shown and explained ($M$ = 4.67), helpfulness on students understanding of the content ($M$ = 4.00), effectiveness of tool in instructional planning ($M$ = 4.67), student engagement ($M$ =4.33), quality of the instruction ($M$ = 4.67), and implementation of the instruction ($M$ =4.67).

Table 10

*Results of Social Validity Questionnaire*

| **Item Description (5-Point Scale)** | **Teacher 1 Rating** | **Teacher 2 Rating** | **Teacher 3 Rating** | **Mean** |
|---|---|---|---|---|
| 1. Is T-TIP prompts a way to plan the lesson and deliver the supplemental reading instruction? | 4 | 4 | 5 | 4.33 |
| 2. Was the progress of lesson planning shown and explained? | 5 | 4 | 5 | 4.67 |
| 3. How helpful was T-TIP prompt with regard to the students' understanding of content in T-TIP lesson planning? | 4 | 4 | 4 | 4 |
| 4. Was it easy to set up the T-TIP lesson planning? | 4 | 5 | 4 | 4.33 |
| 5. How effective was it with the tool in instructional planning? | 5 | 4 | 5 | 4.67 |
| 6. What is your overall satisfaction of the tool? | 4.5 | 4 | 5 | 4.5 |
| 7. Did you feel your students enjoy reading instruction? | 4 | 4 | 4 | 4 |
| 8. Did you see improvement in student engagement? | 5 | 4 | 4 | 4.33 |
| 9. Did you see improvement in your teaching pedagogy? | 5 | 4 | 5 | 4.67 |
| 10. Were the changes noticeable in the classrooms? | 4.5 | 4 | 4 | 4.17 |
| 11. Are you satisfied with the training on the planning tool? | 4 | 4 | 5 | 4.33 |
| 12. Will you continue using T-TIP in your class in the future? | 5 | 4 | 5 | 4.67 |
| 13. Would you recommend this planning tool to other teachers in the future? | 5 | 4 | 5 | 4.67 |

*Note*. 5-point Likert Scale: 1 – Very dissatisfied; 2 - Dissatisfied; 3 - Not Sure; 4 – Satisfied; 5 - Very Satisfied

In addition, all teachers reported that there had been an improvement in behavior (corrective and elaborative feedback was provided to students) ($M$ =4.67). All special education teachers found the intervention easy to use ($M$ = 4.33) and would recommend the T-TIP to other special education teachers who teach in self-contained classrooms in the future ($M$ = 4.67). And they all promised to continue using T-TIP in their future classes ($M$ =4.67). Specifically, Teacher 2 reported that she was very satisfied ("5") how the T-TIP was easy to integrate into her existing lesson planning system. Teacher 3 was also very satisfied ("5") with the planning tool, which helped her improve the pedagogical behaviors in reading instruction. Moreover, Teacher 1 felt the T-TIP was very effective ("5") in her lesson planning process and noticed a huge improvement in student engagement in her literacy instruction.

**Teacher Notes**

With respect to the suggestions from teachers on the T-TIP planning prompt, one teacher commented, "I was pleasantly surprised on what I got out of this experience." The other teacher suggested "I feel as though the training and tool were very comprehensive and a good way to remind myself to return to the different ways of giving feedback to students. It challenged me to vary my ways in which I responded to students to best meet their needs in reading instruction." And another teacher also emphasized "I did appreciate the information on the varying ways to give student feedback. I found it very helpful in helping students' understandings of the content. T-TIP was also easy to integrate into my existing system and the tool in instructional planning was very effective. In addition, the T-TIP planning tool helps me pay much more attention to the way I deliver feedback." The Likert-scale scores, supported by the comments, indicated that the teachers found the T-TIP planning prompt and the related training to be useful and valuable.

## Additional Findings

### Specific Types of Feedback

**Specific Correction.** The overall rate of providing specific correction per minute at the conclusion of the T-TIP intervention phase is summarized in Table 11. The mean number of specific correction produced during baseline and the T-TIP intervention is presented in Table 11. Substantial increases in the mean of providing corrective and elaborative feedback were observed. During the intervention phase, the mean improved considerably from 0.00 during baseline condition to 0.10 during the intervention condition. Among three teachers, Teacher 3 showed the most improvement by more than 0. 07 compared to her baseline phase (0.03). Teacher 2 demonstrated some improvement with about 0.03 compared to her baseline phase (0.00). Teacher 1 improved the least with her mean performance staying the same during the intervention phase (0.03). The total number of providing specific corrections ranged from 0.00 to 0.15 during baseline and ranged from 0.00 to 0.45 during intervention condition.

In intervention level, on average, Teacher 2 spent 15% of the feedback on giving specific correction, such as directly correct student answers by providing immediate and specific feedback. Compared to no specific correction provided in baseline, this type of feedback increased after the intervention. Teacher 3 spent about 9.8% of feedback on giving specific corrections, which increased after the intervention as well (8% on baseline). However, on Teacher 1's specific corrections, 25% on baseline condition and 3% on intervention condition was noticed. That is, after the T-TIP was introduced, Teacher 1 diminished providing specific correction of student response and focused more on other types of feedback (e.g., establish goals).

Table 11
*Performance on Specific Types of Feedback across Phases*

| Types of Feedback | Condition | Teacher 1 | | | | Teacher 2 | | | | Teacher 3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Mean** | **Median** | **SD** | **%** | **Mean** | **Median** | **SD** | **%** | **Mean** | **Median** | **SD** | **%** |
| Specific Correction | Baseline | 0.03 | 0.00 | 0.05 | 0.25 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 0.00 | 0.04 | 0.08 |
| | Intervention | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.15 | 0.15 | 0.10 | 0.05 | 0.12 | 0.10 |
| Informative Correction | Baseline | 0.05 | 0.05 | 0.06 | 0.35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.13 | 0.10 | 0.13 | 0.33 |
| | Intervention | 0.16 | 0.15 | 0.08 | 0.20 | 0.00 | 0.00 | 0.02 | 0.03 | 0.18 | 0.15 | 0.19 | 0.17 |
| Error Analysis | Baseline | 0.01 | 0.00 | 0.02 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Intervention | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.02 | 0.01 |
| Instructive Feedback | Baseline | 0.04 | 0.00 | 0.06 | 0.27 | 0.02 | 0.00 | 0.04 | 0.67 | 0.15 | 0.15 | 0.10 | 0.39 |
| | Intervention | 0.13 | 0.10 | 0.13 | 0.15 | 0.11 | 0.00 | 0.15 | 0.60 | 0.49 | 0.50 | 0.40 | 0.49 |
| Explanatory Feedback | Baseline | 0.01 | 0.00 | 0.02 | 0.06 | 0.01 | 0.00 | 0.02 | 0.33 | 0.01 | 0.00 | 0.03 | 0.02 |
| | Intervention | 0.03 | 0.03 | 0.03 | 0.03 | 0.00 | 0.00 | 0.02 | 0.03 | 0.01 | 0.00 | 0.04 | 0.01 |
| Monitoring Feedback | Baseline | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.05 | 0.07 | 0.18 |
| | Intervention | 0.06 | 0.05 | 0.08 | 0.08 | 0.03 | 0.00 | 0.06 | 0.15 | 0.19 | 0.15 | 0.16 | 0.18 |
| Reteach | Baseline | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Intervention | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.02 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 |
| Establish Goals | Baseline | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | Intervention | 0.43 | 0.40 | 0.18 | 0.52 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 0.11 | 0.07 |

*Note.* Means are based on the rate per minute. The percentage refers to the proportion of specific types of feedback within the overall feedback provided in the instruction.

In giving specific feedback, the median data point among three participants varied: for Teacher 2, the baseline phase was 0.00; compared to 0.00 in the intervention, there was no improvement in this specific type of feedback across adjacent phases. Teacher 3 demonstrated somewhat improvement, however, the median was still not obvious enough (0.00 to 0.05 across phases). Although there was no change in the mean of providing specific corrections and even percentage was decreasing in intervention, Teacher 1 did revealed her improvement in giving this specific correction after the intervention was introduced (from 0.00 in baseline to 0.03 in the intervention).

**Informative Correction.** Informative correction was defined as providing prompts, hints, or cues to assist the learner in determining correct answers. The mean number of Informative correction produced during baseline and the T-TIP intervention is presented in Table 11. During the intervention phase, the mean improved from 0.13 during baseline condition to 0.18 during the intervention condition. Teacher 1 improved the most by more than 0.11 compared to her baseline phase (0.05). Teacher 3 demonstrated some improvement by more than 0.05 compared to her baseline phase (0.13). However, there was no improvement or significant changes in Teacher 1's informative correction, as her mean performance stayed the same across phases (0.00 in baseline and 0.00 in intervention respectively). Among three teachers, the total number of providing informative correction ranged from 0.00 to 0.30 during baseline and ranged from 0.00 to 0.50 during intervention condition.

In the intervention, Teacher 1 spent 16% of the instructional time on giving informative correction; Teacher 3 spent about 17% of instructional time on giving this type of feedback; however, there was no significant change in Teacher 2's informative feedback, with no informative feedback on baseline condition and 3% of instructional time on intervention

condition. With regard to the median data point among three participants, it also varied. For example, Teacher 1 demonstrated the median point in giving informative feedback in the baseline phase (0.05), compared to 0.15 in the intervention, which demonstrates that there was an improvement in using this specific type of feedback across adjacent phases. Teacher 3 had the median of 0.10 in the baseline to 0.15 in the intervention. However, Teacher 2 stayed the same across phases (0.00 in baseline and 0.00 in intervention).

**Error Analysis.** Error analysis refers to specifying types of mistakes and clarifying reasons of making mistakes on student responses. Compared to other types of feedback, error analysis did not demonstrate a significant change across three participants. The mean and median data point across three participants stayed the same (0.00 in baseline to 0.00 in intervention). Among three teachers, the total number of providing error analysis ranged from 0.00 to 0.07 per minute during baseline and ranged from 0.00 to 0.10 per minute during intervention condition.

**Instructive Feedback.** Instructive Feedback involves adding supplemental information to student responses. For example, teachers expand information related to the topic, generate higher-order thinking questions, repeat student responses and/or give novel information to supply the correct target answers. After the instructive feedback was introduced, the mean improved from 0.04 during baseline condition to 0.13 during the intervention condition in Teacher 1, and Teacher 2 improved from 0.02 per minute to 0.11 per minute in giving instructive feedback. Teacher 3 improved the most by more than 0.34 compared to her baseline phase (from 0.15 per minute in baseline to 0.49 per minute in the intervention). Among the three teachers, the total number of providing instructive feedback ranged from 0.00 to 0.30 during baseline and ranged from 0.00 to 1.35 during intervention condition.

On average, Teacher 1 spent 15% of the overall feedback on giving informative correction; Teacher 2 spent about 60% on giving this type of feedback; however, there was a slight decrease in Teacher 2's instructional time, from 67% on baseline condition to 60% of the overall feedback on intervention condition. Teacher 3 increased the proportion of providing instructive feedback in her lesson by more than 8% (from 39% in baseline to 47% in intervention).

The median data point across phases indicated a change in Teacher 3 in the intervention: compared to 0.15 in the baseline, the median in intervention was 0.50, which demonstrates a decent improvement in using this specific type of feedback in adjacent phases. However, there was no improvement or significant changes in Teacher 1 and Teacher 2's performances, as their median data stayed the same across phases (0.00 in baseline and 0.00 in intervention respectively).

**Explanatory Feedback.** Explanatory feedback requires that teachers provide modeling on how to resolve problems, answer questions, and/or how to improve and avoid similar mistakes in the future. In comparing to the baseline and intervention data, there was no significant change in explanatory feedback after the intervention was introduced to the three teachers. Especially, the mean stayed the same in Teacher 2 and Teacher 3 (T2 and T3 were from 0.01 per minute in baseline to 0.01per minute in intervention). Teacher 1 demonstrated some improvement with about 0.03 compared to her baseline phase (0.01), but still the change was not obvious enough. Moreover, the median did not demonstrate a significant change across three participants, for example, the median data points in Teacher 2 and Teacher 3 was 0.00 across phases and the median in Teacher 1 was 0.03, compared to 0.00 in baseline.

**Monitoring Feedback.** It is also known as the overall feedback followed with specific suggestions or comments. Teacher 3 provided more monitoring feedback in the intervention, with the mean of 0.19 per minute observed. In addition, the median between baseline and intervention also demonstrated discriminable changes in providing monitoring feedback in Teacher 3 classes (0.05 per minute in baseline and 0.15 per minute in intervention). Meanwhile, in the other two teachers' classes, there was no difference in providing monitoring feedback in adjacent phases.

**Reteach.** Reteach refers to the teacher's emphasis on the key information when student responses are incorrect due to limited knowledge. Like explanatory feedback and error analysis, the three teachers changed very little on reteach. The mean and medium data point across three participants stayed the same (0.00 in baseline to 0.00 in intervention) and the total number of reteach ranged from 0.00 per minute during baseline and ranged from 0.00 to 0.07 per minute during intervention condition.

**Establish Goals.** When establishing goals, it is important to guide students to write/set short-/long-term goals before and/or after the instruction is initiated. Among three teachers, Teacher 1 is considered to achieving the most by more than 0. 43 per minute in establishing goals compared to her baseline phase (0.00). In addition, 52% of the instructional time was observed in helping students set goals and the median of the behavior in the intervention was 0.40, compared to 0.00 in the baseline. However, the other two teachers did not demonstrate significant changes in establishing goals across adjacent phases.

## Gaps between Lesson Planning and Implementation of Instruction

As observed in the intervention phase, a gap between teachers' lesson planning and the implementation of instruction occurred (Table 12).

Table 12

*Probability of Occurrence between T-TIP Lesson Prompt and the Implementation of Instruction*

| | | Types of Feedback (Probability) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Participants | Specific Correction | Informative | Error Analysis | Instructive | Explanatory | Monitoring | Reteach | Establish Goals |
| T-TIP Lesson Plan | Teacher 1 | 0.25 | 0.50 | 0.50 | 0.25 | 0.00 | 1.00 | 0.00 | 1.00 |
| | Teacher 2 | 0.63 | 0.18 | 0.00 | 0.09 | 0.09 | 0.73 | 0.00 | 0.00 |
| | Teacher 3 | 0.76 | 0.59 | 0.47 | 0.76 | 0.24 | 0.88 | 0.18 | 0.18 |
| Literacy Instruction | Teacher 1 | 0.50 | 1.00 | 0.00 | 0.75 | 0.50 | 0.50 | 0.00 | 1.00 |
| | Teacher 2 | 0.27 | 0.09 | 0.00 | 0.45 | 0.09 | 0.27 | 0.09 | 0.00 |
| | Teacher 3 | 0.76 | 0.65 | 0.06 | 0.94 | 0.12 | 0.94 | 0.00 | 0.35 |

*Note* .The probability of the occurrence of each types of feedback is calculated with the formula = Sum (specific type of feedback in the intervention phase)/ total number of observations in the intervention

Based on teachers' lesson planning on the T-TIP prompt, the three teachers documented the intent of implementing specific correction, informative correction, error analysis, instructive feedback, and monitoring feedback in their lessons. Specifically, on each lesson, the probability of Teacher 2 using the specific correction in her lesson plan is 0.63, and the probability of 0.18 on informative correction, 0.09 on instructive feedback, 0.09 on explanatory feedback, 0.72 on monitoring feedback, and no error analysis, reteach, and establish goals was planned in her lesson.

The probability of Teacher 3 in using specific correction in her lesson plan is 0.76, another 0.59 on informative correction, 0.47 on error analysis, 0.76 on instructive feedback, 0.24 on explanatory feedback, 0.88 on monitoring feedback, 0.18 on reteach, and 0.18 on establishing goals were obtained from her lesson prompt. In addition, the probability of Teacher 1 in using specific correction in her planning process is 0.25, and 0.5 on informative correction, 0.5 on error analysis, 0.25 on instructive feedback, 1.00 on monitoring feedback, as well as 1.00 on establishing goals.

However, in the 20-minute observation, the probability of implementing each specific types of feedback is different. In the intervention phase, the probability of Teacher 2 using specific correction in responding to student performance is 0.27 (compared to 0.63 on the lesson plan) and 0.27 on monitoring feedback (compared to 0.73 on lesson plan) was observed. Other types of feedback, such as informative correction also demonstrated a gap between the lesson plan (0.18) and the implementation of instruction (0.09) in Teacher 2's classes. Teacher 3 also demonstrated the gap between lesson planning and the real instruction. For example, the probability of implementing the error analysis 0.06 (compared to 0.47 on lesson plan), explanatory feedback 0.12 (compared to 0.24 on lesson plan), and reteach 0.00 (compared to

0.18 on the lesson plan). Additionally, the difference between Teacher 1's lesson plan and instructional delivery revealed that there was no error analysis observed (0.00) in instruction, however, the teacher planned 0.5 of probabilities in giving error analysis in each lesson. Additionally, the probability of monitoring feedback in delivering the instruction is 0.5 only, compared to 1.00 in her lesson plan.

**Literacy Content**

Beyond the teaching pedagogy, observers also coded the literacy content in each sampled classes. In observed self-contained classroom for Teacher 1, 29% of the class involved text structure, 6% involved writing instruction, 6% involved prior knowledge, and 88% on vocabulary instruction. Other reading content, such as decoding, fluency, and cognitive strategies, were not target at all across 17 lessons. The reading content covered in Teacher 3's classes was more comprehensive, with 5% of the class on text structure, 2% of the instruction on writing instruction, 37% on fluency, 40% on prior knowledge, 17% on cognitive strategies (e.g., summarization, predication, and questioning strategy), 20% on vocabulary instruction, and 13% on motivation. For teacher 2, the reading content is varied from the other two teachers. Across 17 sessions, 100 % of the class involved vocabulary and 6% involved text structure. However, no evidence-based vocabulary instruction was provided across all vocabulary instruction, instead, the way teacher taught vocabulary was asking students to read and find the definition themselves without any further explanations in her self-contained vocabulary classes. In addition, no content was observed to improve student skills in writing, decoding, fluency, prior knowledge, cognitive strategies (e.g., summarization, predication, and questioning strategy), and motivation in Teacher 2's lessons.

# CHAPTER V

# DISCUSSION

The purpose of this study was to examine the effects of the T-TIP on Tier Three literacy instruction in high schools. This study reports several findings related to the use of the planning prompt and a summary of specific types of feedback, gaps between lesson planning and instruction, as well as observed Tier Three literacy instruction of this single-subject design research study. Additionally, limitations, implications, and suggestions for future research and practice will be discussed.

## T-TIP Planning Prompt

Studies addressing Tier Three literacy instruction in high school levels have been limited for years (NHSC et al., 2010). Particularly, methods of improving evidence-based pedagogical instruction in Tier Three settings as well as remediating reading problems to address student special needs are currently under development in the field of special education. Previous researchers (Keller, 2000; Kame'enui & Simmons, 2003) developed tools that emphasize a cognitive approach to lesson planning. However, the effectiveness of planning tools for reading instruction is generally not reported and investigated in any research study. In addition, until now, no studies examined the effects of the lesson prompt on teachers' providing corrective and elaborative feedback in high school Tier Three classrooms. This study fills the gap by investigating the effectiveness of the T-TIP prompt on improving teachers' pedagogical behaviors in providing corrective and elaborative feedback in their lesson planning and implementation of instruction in high school Tier Three classrooms.

### The Overall Effect of T-TIP Prompt

This multiple baseline across subjects design permitted a demonstration of the effects of the independent variable (T-TIP planning prompt). Conditions of the experiment were baseline, intervention, and maintenance phases across three subjects. Positive changes in the data series with the introduction of the intervention at different stages for each participant revealed that overall the T-TIP prompt has effects on increasing teachers' behaviors in providing corrective and elaborative feedback. Specifically, all subjects demonstrated a substantial increase in the rate of corrective and elaborative feedback in Tier Three settings following the T-TIP training, with all subjects improved the target performances. Two subjects (Teacher 1 and Teacher 3) responded to the intervention immediately and demonstrated substantial increase in the rate of providing corrective and elaborative feedback after the training. Additionally, an increasing trend was noted for two subjects (Teacher 1 and Teacher 2) as treatment progressed. This result indicated the T-TIP planning prompt was effective in Tier Three literacy lesson planning for this sample of participants. Particularly, all subjects were able to use the T-TIP prompt to improve their behaviors in providing corrective and elaborative feedback in their Tier Three instruction, and increased the average rate of providing feedback following the T-TIP training.

However, as observation progressed, the intervention became more selective in utilization. For example, Teacher 3 whose fidelity of implementation compared to the other two teachers was low (88%), the effects of implementation of the intervention faded over time. Especially, the variability in the intervention process was noticeable in Teacher 3's instruction. The implementation of providing corrective and elaborative feedback dropped to the baseline level occasionally across the phase. However, considering the unusual instruction provided in some classes (e.g., rewarding students to watch movies after students reached reading goals), some other factors might need to be considered in the implementation process. To address this concern,

we attempted to minimize the impact of instructor variability by asking teachers to deliver the instruction in their typical classes, having teachers check each step of the lesson plan, and asking the teachers to inform us their changed schedule ahead of time. Even with all these attempts in place, some variability inevitably occurred in the process.

Notably, during the data collection, each time Teacher 3 neglected using the T-TIP in lesson planning, the rate of the target behavior (providing corrective and elaborative feedback) decreased significantly. This finding confirms previous research (Graham & Harris, 1992) that the most effective results are obtained when the full instructional package is employed. Particularly, Teacher 1 and Teacher 2 demonstrated consistent improvement in providing feedback when full fidelity of implementation was applied. Compared to other teachers, Teacher 3's fidelity was relatively low (88% across the intervention condition) and some fluctuation was the result.

As indicated in the results, the fidelity of implementation in this study generally serves three functions (Chan, O'Reilly, & Lang et al., 2000; Cooper, Heron, & Heward, 2007; Lang et al., 2010). First, high treatment fidelity increases the level of certainty that the observed changes in behavior were due to the intervention (Chan, et al., 2000; Cooper, Heron, & Heward, 2007). Second, the fidelity of implementation indicates the effectiveness in the training process (Lang et al., 2010). And third, the treatment fidelity data supports the teacher social validity questionnaire that the teacher acceptance is shown in their implementation (Chan, O'Reilly, & Lang et al., 2000). If the teacher is more confident and comfortable in implementing the intervention, the acceptability level and the fidelity of implementation would be relative high. Otherwise, the fidelity and satisfaction level would be relatively low if the teacher is less comfortable with the implementation process.

The high level of fidelity of implementation and teacher acceptability of the intervention also indicates one of the notable functions, as Teacher 2 commented, "It prompts teachers in thinking and implementing corrective and elaborative feedback during the lesson planning and literacy instruction process". In this process, the operational definitions and examples and non-examples were the keys to facilitate teachers' understanding and selecting appropriate feedback based on the goal of instruction. When teachers adopted the T-TIP in the lesson planning, they were prompted to recognize feedback that they could address based on student needs.

Additionally, the T-TIP planning prompt was found to be easy to administer. Teachers could easily use it as a supplemental lesson plan as it offers example activities, prompted questions, and space for teachers to generate lesson plans. Teachers could also use the T-TIP as a checklist to target critical considerations in the lesson planning process. Example activities and planning questions on the prompt help teachers think about ways of addressing the pedagogy in their lesson and focus their mental energy on critical instructional considerations related to explicit instruction (Wilson et al., 2013).

In general, the findings of this research study are promising in that the complexity of instructional planning is reduced and the quality of Tier Three literacy instruction in secondary schools is improved. The findings are in accordance with Pianta and Hamre (2009), who suggest that a good classroom planning tool plays an important role in an accountability framework as (a) it directly measures evidence-based instruction that impacts student achievement, (b) it helps hold teachers accountable to enacting those behaviors/instruction, and (c) it identifies research-based interventions that can be supported in instructional planning. Thus, this classroom planning prompt may help teachers and administrators define and implement high quality Tier Three reading interventions, and identify areas for ongoing professional development.

### Generalization and Maintenance of T-TIP

Although it is generally agreed that follow up and maintenance are critical components of instructional approach (Case, Harris, & Graham, 1992; Kendall, 1989), little research has actually examined this phase. This study tested the maintenance of the T-TIP prompt during which no intervention or formal practice occurred within two weeks. Two subjects (Teacher 1 and Teacher 2) maintained improved performance on target behaviors, which can be reflected from teachers' social validity questionnaires. The other teacher (Teacher 3) whose behaviors had initially improved after the intervention was introduced returned to baseline rate in one observation; another maintenance observation showed a small increase (compared with the intervention phase) in providing corrective and elaborative feedback. It should be remembered that the maintenance phase occurred a week before final exams, teachers had just begun to review content to prepare for the final. It was also possible that the time of the instruction resulted in teachers taking it less seriously than they would, which resulted in less than optimal performance.

## Additional Findings

In addition to the research questions, some additional findings regarding specific types of feedback, gaps between lesson plan and implementation of instruction, as well as general literacy instruction were interpreted and discussed. These additional findings and discussions might provide useful information that prompt future research and practice to better help special education teachers in lesson planning and the implementation of literacy instruction.

### T-TIP on Specific Types of Feedback

Based on teacher and student needs, the specific types of feedback in each lesson were varied. Some students might need more guidance on their mistakes and thus need specific

correction; and others might need supplemental information to guide through the learning process. Considering the variation in student needs, it is important to differentiate instruction with appropriate feedback provided for students with disabilities in Tier Three settings. Differentiated instructional strategies acknowledge students' diverse strengths and provide flexibility in terms of content, processes, and products to meet student individual learning needs (Nobel, 2004). However, as demonstrated in previous research (Nobel, 2004; Tomlinson et al., 1997), both beginning teachers and experienced teachers are reluctant or unable to differentiate their instruction to accommodate diverse student needs in special education.

The current findings agreed with previous research that few chances were observed where participants provided differentiated instruction and feedback to target student special needs in Tier Three settings, which would be problematic as students with severe reading deficits might struggle with the "one-size-fits-all" model. For example, after the T-TIP was introduced, Teacher 1 mainly focused on setting goals and analyzing errors for the whole group; while, the explanatory feedback that might need to be adapted to fit individual needs was ignored in the process. Teacher 3 also pointed out that it was difficult to provide different feedback to accommodate individual student needs with the T-TIP.

There are two possible reasons that might explain this difficulty: (a) a large group size in self-contained classrooms at high schools, and (b) varied student needs in the same classrooms. In the case of (a), study participants taught an average group size of 10 to 12 students. Compared to the suggested group size (1 to 5 students) from previous studies (Harn, Linan-Thompson, & Roberts, 2008; Torgesen, 2001), this group size is much larger and may pose more challenges to differentiating instruction. In the case of (b), in the observed classroom (Teacher 3), students represented grades 9-12, and thus reflected a wide variation in reading difficulties in either word

decoding or reading comprehension. These reasons are in accordance with Vaughn et al., (1998) in that special education teachers are regularly presented with groups that are too large and too heterogeneous (Denton & Vaughn, 2003; Vaughn et al., 2000), for the efficient provision of targeted instruction.

Particularly, when providing feedback, within eight types of feedback, some types faded more quickly than others. Teachers were observed to provide feedback on specific correction, informative correction, instructive feedback, and setting goals. However, error analysis and explanatory feedback that are critical in addressing student problems and improving student future performances were observed dismissed from most teaching instruction. As observed, only Teacher 1 rooted and analyzed student errors, other teachers either did not provide any error analysis or little explanatory feedback was implemented to explicitly model of taught-skills and their corresponding cognitive processes via demonstration and think-aloud, even after students repeated similar mistakes over time. As feedback is an important aspect of every school day and plays a critical role in the teaching process (Konold, Miller, & Konold, 2004), providing appropriate feedback to let students know what they doing right, how to correct the mistakes, as well as reinforce appropriate learning behaviors is critical (Miller, 2002). Therefore, it is particularly important for future research to address the effectiveness of specific types of feedback provided to target student special needs in Tier Three settings.

**Gaps between T-TIP Lesson Planning and Implementation**

As explained in Wilson et al., (2013), instructional planning is only the beginning of implementing high-quality Tier Three instruction. Although the T-TIP facilitates educators in lesson planning to expend their energy for instruction and problem solving with students, without the fidelity of instruction that is aligned with the well-developed lesson plans, quality instruction

might not occur. The finding of this study is consistent with prior research (Avalos, 2011; Hobson, Ashby, Malderez, & Tomlinson, 2009; Vermunt & Endedijk, 2011) that indicates teachers might demonstrate reluctance in implementing the lesson plans. Both Teacher 2 and Teacher 3 planned to provide the explanatory feedback and error analysis; however, in the implementation, there was no explanatory feedback provided and teachers did not give error analysis to students throughout the coding instruction.

There are a number of possible explanations for the gap: (a) there was confusion in teachers' understanding the concept of feedback. In this single subject design, although operational definitions were introduced while training, teachers may have still had difficulties in understanding the differences among eight concepts, (b) actual student reactions might have been different from what was expected. Despite the anticipation, delivering the instruction might also considered student reactions toward each feedback, and (c) the possibility that teachers did not apply what they planned in the first 20 minute of instruction, but they might have thereafter. Given only 20- minute intervals of instruction were coded for in each class, the application of what teachers had planned for may have occurred outside of the coded instruction.

To close the gap, although some possible recommendations exist to support teachers in professional development (e.g., supportive school board and/or school-university partnership), there are few studies designed to accommodate special education teachers in their professional development. In addition, most of current professional development does not always encourage the expert thinking skills necessary for confronting with teachers, such as how to get teachers started who have limited prior knowledge and how to link skills to the purpose of instruction (Mitchell, Reilly, & Logue, 2009; Scadamalia & Bereiter, 1989). Considering special education teachers might have concerns teaching diverse needs of students and lack experience in

differentiating instruction to address student individual needs (Vaughn, 2010), the effective and efficient components in providing professional development for special education teachers to close the gap between lesson planning and implementation are still unknown from current research and therefore might need more attention.

**Observed Tier Three Literacy Instruction at High School Level**

The current study also demonstrated some interesting findings regarding the evidence-based literacy instruction, as well as the reading content in Tier Three literacy instruction at high school levels.

**Evidence-based Reading Instruction**

In observed Tier Three classrooms, two out of three teachers did not provide evidence-based literacy intervention in the RtI framework. Especially, Teacher 1 and Teacher 2 with more than 16 years of teaching experience preferred literacy instruction based on their own experience instead of reading intervention proven to be effective in rigorous research studies. For example, when Teacher 2 delivered vocabulary instruction, rather than using different vocabulary strategies to facilitate students with disabilities in learning vocabulary, the teacher asked students to read the definitions by themselves without any further explanations or practice.

Denton, Vaughn, and Fletcher (2003) proposed two possible reasons that research-based reading instruction might not be implemented by some experienced teachers, including (a) lack of information about effective practice in reading instruction; and (b) disbelief that research-based instruction is as effective as their own teaching experience. However, without evidence-based literacy instruction provided, as Blachman, Schatschneider, and Fletcher (2004) argued, when students received the instruction rather than the intervention that was being investigated, their reading skills actually declined over the two years of the study. To provide high quality

instruction for students with disabilities, research-based reading instruction is highly recommended especially when students who do not make appropriate gains when instruction was provided in the RtI framework (Al Otaiba, Schatschneider, & Silverman, 2005).

**Reading Content**

Congruent with the results of the literature review (Chapter 2), in observed classrooms, fundamental reading skills, such as word decoding and fluency as well as cognitive strategies and motivation have not been addressed in Teacher 1 and Teacher 2's classrooms. Considering most students with disabilities, especially students with learning disabilities, might struggle with efficient and accurate word reading skills and cognitive strategies in reading (Faggella-Luby & Deshler, 2008; Torgesen, 2002), this difficulty in efficient word reading and cognitive strategy may negatively impact the development of vocabulary and reading comprehension, as well as motivation and attitude toward reading (Brown & Palincsar, 1986; Cunningham & Stanovich, 1998; Harn, Linan-Thompson, & Roberts, 2008; Juel, 1988). Therefore, effective teachers might need to clearly integrate different reading components of learning to read for students with different needs and remediate reading deficits in high school Tier Three classrooms.

**Summary of Findings**

In summary, study findings showed several influential factors that must be considered when designing and implementing a lesson planning prompt in Tier Three literacy instruction to remediate reading deficits for students with disabilities. The results of this study are significant for several reasons:

First, this study is one of the first to investigate the effectiveness of a planning prompt for Tier Three literacy instruction in high school settings. The special education teachers were familiar with both interventions and found them easy to administer and compatible to their own

lesson planning process. When implementing the T-TIP prompt, teachers were not overburdened and the intervention was acceptable in additional to their intense work and instruction. As indicated in Pianta and Hamre (2009), a good classroom planning tool should save teachers' efforts on lesson planning by identifying research-based interventions that can be supported in instructional planning.

Furthermore, this study adds to the body of literature on Tier Three literacy instruction, particularly in providing specific feedback in high schools. In this research, some specific types of feedback was observed in the Tier Three settings, however, which component plays the critical role in improving teaching behaviors is under investigation. Therefore, the findings in this study need to be replicated and extended across other study designs to investigate the effects of types of feedback on teachers' literacy instruction.

Finally, in the present study, a gap might have occurred between teacher lesson planning and implementation of the instruction. Prior to this research, few articles indicated or investigated the gap in lesson planning and intervention implementation. This study potentially contribute to the gap in the literature by comparing and contrasting teacher lesson planning and implementation in different phases from baseline to intervention.

## Limitations

Overall, the T-TIP prompt resulted in improved pedagogical behaviors in providing corrective and elaborative feedback in self-contained classrooms in the study. However, these findings should be interpreted cautiously given the following limitations.

Traditionally, a major issue in single-subject design research has been that findings from one study might not generalizable to different individuals outside of the study (Kadzin, 2011). The pool of 3 participants was a limiting factor in this research study. Especially, the

generalizability of the study findings is limited. However, considering this study utilized a direct replication across three subjects in its design, treatment effects may be generalizable to individuals with similar experiences and characteristics in the study. Regardless, generalization to other subjects and settings must be tested more thoroughly to provide stronger conclusions.

Second, some on-going behaviors, such as providing feedback, are difficult to record simply by frequency because each response may occur at different duration (Kadzin, 2011). Especially, in this study, providing corrective and elaborative feedback was the target behavior. When a teacher talked to a student for 15 seconds and talked with another student for 30 seconds, the duration of the feedback was different, however, the tally was counted as the same (1 instance of providing feedback). Therefore, a great deal of information is lost by simply counting the frequency of the behavior as the duration is different. In the future study, momentary time sampling (MTS) in each 15s or 30 s might be a consideration in targeting the specific reading instruction in classrooms.

Third, as a rule, when selecting the A-B cases (e.g., three subjects), it is suggested to select participants as similar as possible on all relevant features (e.g., age, class, year of experience, and so on). However, considering the limited resources within the district, it is difficult to select appropriate participants based on the rule. In this study, three special education teachers are very different with regard to ages and years of teaching experience. On the other hand, participating teachers have similarities in providing instruction in Tier Three settings and they are from the same school districts with similar students taught in observed classes.

Fourth, this investigation focused on the role of the T-TIP prompt on the instructional behavioral changes in providing feedback, however, the contribution of other important factors (e.g., reading content) has not been fully examined in this study. A further potential weakness of

the study is the limitation with regard to the measure of only testing a portion of the logic model (Appendix I), excluding student behaviors in this study. The focus of the study was on teacher instruction through T-TIP prompts. However, this study is not designed to examine the relationship between teachers' use of T-TIP prompts and any change in student behavior. This limitation may impede our further understanding of the influence of types of student errors on corresponding teachers' corrective and elaborative feedback given in each Tier Three class settings.

Fifth, the time of school year may be a confounding factor in this study. Teachers required a fewer number of sessions to complete the intervention as summer was approaching. Additionally, observation sessions were different across three participants because of varied teaching schedules. As well, there were some concerns from teachers and students with regard to the audio recordings. To protect the confidentiality of teachers and students, we generally observed and coded 20-minute instruction as the sample. As such, it is difficult to attribute the findings in this study directly to T-TIP prompts implementation. Some other factors, such as the variable of scheduling and time of observation, might need to be considered.

Sixth, the fidelity of implementation conceptualized in this study was not rigorously designed. The fidelity of implementation questionnaire and T-TIP lesson prompt only reflect teacher lesson planning, however, teachers' implementation of instruction in accordance with the lesson plan was not fully investigated.

Finally, as with other research studies, observer effect in which a researcher's cognitive bias unconsciously influence the participants of an intervention, which is a threat to internal validity. To limit this threat, we used audio recorder instead of in-person observations in the

classrooms. We also had a group of two observers coded different data individually as well as calculated interrater reliability with the same observations across phases.

## Implications for Future Research

The conclusions of this study have implications for special education teachers to implement literacy instruction in Tier Three settings. Future exploratory studies in Tier Three literacy instruction could focus more on three additional areas for research, including (a) involve the other components of reading pedagogy in T-TIP prompt and investigate its effectiveness; (b) collect more data on reading content, such as how to select appropriate reading content based on student needs; and (c) involve student performance in the future study.

*Involve other reading pedagogy in T-TIP prompt*. Other reading pedagogy (e.g., control task difficulties or carefully sequencing) should be researched with emphasis on the effectiveness of using T-TIP to improve pedagogical behaviors for students with disabilities in Tier Three classrooms. Future studies should systematically investigate which components/pedagogies are most salient for successful performance, thereby, validating the planning prompt and examining the relative contributions of implementation of the instruction that is effective for teacher lesson planning, is important to determine the variables responsible for change in teachers' behaviors.

*Collect data on reading content*. As introduced above, it was noticeable that the reading content in Tier Three classrooms was not designed in accordance with student individual needs. However, the potential reasons behind were outside the scope of this study. To investigate the decision making process, it is important to involve data on reading content. For example, how did teachers collect data to decide which content is important to focus on in this class? Is it based on student needs or is assigned by the school? And for high school students who have severe

reading difficulties in basic reading skills (e.g., fluency or phonemic awareness), how could teachers intervene?

*Investigate student performance and student reaction toward the tool*. Future research should address student performance and involve student reaction toward the implementation of T-TIP in literacy instruction at high school levels. In this study, with limited time, the focus was on teachers' reactions toward the tool. However, some students might have concerns or showed some special interest toward the tool when their teachers used in the daily basis. In addition, involving the data of student performance would help to examine whether a student's underachievement is due to lack of skills and whether the target intervention best improves academic performance. Continuous data collection on student performance and reaction also assists researchers in modifying the intervention in the future to maximize student progress in academic performance (Stecker, Fuchs, & Fuchs, 2005). Therefore, to investigate the effectiveness of the tool, it is highly suggested that involve student performance to facilitate the understanding of the generalization of effective classroom-based interventions.

In summary, the results of this study offer a promising planning prompt for special education teachers in Tier Three literacy instruction in high school settings. By providing T-TIP prompt in lesson planning, the specific instruction in giving feedback can be facilitated. However, more research is needed to determine the feasibility of T-TIP prompt in self-contained classroom and/or Tier Three classrooms.

## Implications for Practice

The intervention (T-TIP) provided to the special education teachers had many common components that are aligned with best practice. Previous research studies (Donovan & Cross, 2002; Denton, Vaughn, & Fletcher, 2003) consistently documented the need for an effective and

knowledgeable teacher implement the evidence-based reading instruction to remediate student reading deficits and improve student reading skills. We also learned from this research with some important experience that could facilitate future practice in implementing T-TIP prompt in lesson planning and reading instruction.

It is important to increase teachers' knowledge on the importance of providing corrective and elaborative feedback in literacy instruction by discussing the importance of feedbacks for students with severe reading deficits. Since teacher behaviors might change with their attitudes, emphasizing the importance as well as preview the T-TIP prompts to address this issue is critical, particularly, special education teachers have competing time demands. Introducing the importance as well as arousing teachers' interest in using the tool is the prerequisite for the future implementation with fidelity.

Moreover, during the training, clarification of the operational definitions and example/non-examples for each concept of instruction is important. Especially, some similar concepts might need additional clarifications. By comparing/contrasting the differences and similarities between the two concepts, when teachers use the operational definitions for future references, they could distinguish clearly. This experience also confirmed with special education teachers that without operational definitions and examples/non-examples to facilitate the understanding, they would be frustrated. Therefore, clarifying operational definitions for each component in T-TIP planning prompt is necessary and highly recommended.

In addition, in giving professional development on T-TIP planning prompt, it was also clear that booster training might help teachers clarify the concept and provide more opportunities for teachers to practice. Particularly, when teachers showed difficulties in implementing the intervention or lost interest and persistence on the intervention delivery, it is important to

investigate the possible reasons as well as use booster training in response to a lack of skill acquisition during initial training or after training when teacher performance decreased. Booster training could consist of a progression from a verbal clarification of the concepts, role-plays or hands-on activities, modeling, immediate feedback, and follow-up (Miller, 2009; Van Camp, Montgomery, Vollmer, et al., 2008). Teachers progress through the training stages until there is no confusion and demonstrate high levels of accuracy in the professional development.

Previous research studies (Avalos, 2011; Breault, 2010; Buczynski & Hansen, 2010; Castle, 2006; James & McCormick, 2009; Day & Leitch, 2001; Mushayikwa & Lubben, 2009; Sandholtz, 2002; Showers, Joyce, & Bennett,1987; Olson & Craig, 2001) conclude there are some common characteristics in providing effective professional development to improve teacher lesson planning and implementation of the instruction.

First, teachers will implement the intervention in their classrooms when the trainer presents theory behind the practice. Simply introduce the intervention might not very helpful if the explanation regarding the related theory is not introduced.

Second, in the training process, provide opportunities for guided practice and individual practice is important. Sometimes, even when teachers clarified the theory behind the intervention, the implementation of the intervention is much more difficult. Afford scenarios for group and individual practice in the professional development is necessary as in the process, modeling teachers how to use the tool as well as providing timely feedback during the practice could help teachers in understanding the whole process. In this process, reflection of narrative storytelling and the construction of stories within professional development might help

Third, prompt feedback to the teachers as they engage in the practice. This feedback is not only the feedback in the professional development process, but also timely feedback

regarding teachers' lesson plans. In this study, if teachers revised their lesson plans every time after the instruction, the gap between their lesson plans and the real implementation would be much more diminished. The purpose of the feedback is to help teachers acquire a basic understanding and feeling of competence with a new practice, enabling them to "buy into" it, and that they see results with their students.

Finally, create school cultures that encourage professional development. School culture as well as teacher working conditions may influence what is accepted or suitable for specific types of professional development. The workload may reduce their interest and willingness to implement the intervention and the fidelity of implementation in the delivery process. School administrators are encouraged to create a pleasant environment to illustrate the beliefs, cultures, traditions, and instruction arrangements that could affect teachers' collaboration in school (Jurasaite-Harbison & Rex, 2010; Melville & Wallace, 2007).

## Conclusion

The T-TIP findings from this research are aligned with previous research studies that Tier Three literacy instruction should arouse researchers' attention. For those students who do not respond to the reading instruction that works for most students, they might need "more intensive intervention" (Torgesen, 2000) that is highly explicit, offers in small groups, uses of differentiated instruction, as well as integrates instruction in basic elements of literacy and the application of cognitive strategies. To provide intensive instruction, some teachers might need adequate support and time to participate in meaningful training/professional development and might need additional help from peers and school administrators to support their skills in delivering the instruction. But through the joint efforts from teachers, schools and university partnership, the potential is to bring the reality closer to the promise.

# Appendix A

T-TIP Planning Tool
Based on the work of Wilson, Faggella-Luby, & Wei (2013)

The Tier-Three Instructional Planning Tool (T-TIP), T-TIP: Content

| Component | Example Reading Content Activities | Planning Questions |
|---|---|---|
| Prior Knowledge | Engaging students in a discussion prior to reading about the ideas/themes of the text. | Have I determined what relevant prior knowledge is necessary to introduce for understanding the academic task? |
| | Asking students to reflect on what they already know about a topic and any life experiences they have had that relate to the ideas/themes of the text. | How will I embed learning opportunities in my lesson to introduce, build, and/or clarify my students' relevant prior knowledge? |
| Vocabulary and Concepts | Clarifying the meaning of relevant academic language and/or discipline-specific terminology prior to reading. | Have I analyzed the text for any unfamiliar academic vocabulary and discipline-specific terms? |
| | Providing students with multiple exposures of key terms using examples and non-examples to increase word learning. | How will I introduce student-appropriate definitions and build knowledge of word structure prior to or during my lesson? |
| Text Structure | Explaining how to identify different types of text structures from the curriculum (e.g., narrative, compare/contrast, sequence, or problem-solution) by drawing students' attention to critical text features. | Have I selected readings that represent clear examples of different text structures? |
| | Demonstrating how to use knowledge of text organization to identify key information. | How will I help my students to strategically use the organization of the text to understand key information? |
| Cognitive Strategies | Introducing goal-specific strategies (e.g., summarization, prediction, inferencing, questioning, predicting). | Have I pre-tested my students to learn what strategies are needed to help them accomplish academic tasks? |
| | Introducing packages of strategies to support flexible learning in multiple contexts (e.g., peer-assisted learning strategy and reciprocal teaching). | Have I selected a small number of powerful strategies for my students to master? |
| | Promoting self-monitoring and repair strategies for use during student learning. | How have I planned to use explicit instruction to demonstrate, model, and guide students to independent mastery of new strategies? |
| Fluency | Having students conduct repeated readings of difficult passages while providing error-correction. | Have I chosen texts for fluency practice that also support content area learning? |
| | Modeling appropriate rhythm, stress, and expression (prosody) and asking students to replicate the model while reading the same passage. | Does my lesson include activities that target expression (prosody) in addition to rate? |
| | Educators organize students into high-low reading pairs to conduct partner reading. | What grouping strategies will I use to support fluency practice? |
| Decoding | Teaching students syllabication strategies. | How does my lesson sequence syllabication strategy instruction? |
| | Explicitly teaching rules for decoding the six syllable types. | How does my lesson progress students to apply decoding skills in isolation, in sentences, and then in connected text? |
| | Instructing students to decode multisyllabic words | Does my lesson have high relevance? I.e., does |

| | | |
|---|---|---|
| | by recognizing common prefixes, suffixes, and affixes, as well as common root words. | my lesson focus on root words and affixes that commonly appear in my students' text? |
| Motivation | Increasing student engagement by providing a clear rationale for learning. | When I introduce my topic, how can I emphasize the relevance and value of the topic to stimulate student interest? |
| | Increasing students' perceived self-efficacy by helping them identify their strengths and attribute their effort to their achievements. | How will I ensure that my students receive corrective feedback relevant to reading tasks that identifies their strengths *and* helps them attribute their effort to their achievements? |
| | Affording student chances to choose texts to read. | Does my lesson allow for students to have input and choice in what they read and how they engage with texts? |
| Writing Instruction | Explicitly teaching spelling skills, sentence-construction, and word choice. | Which published or student-created texts will I use to model the spectrum of writing skills? |
| | Teaching students the writing process: goal-setting, planning, drafting, revising, editing, and publishing. | How can I provide opportunities for students to write extended text, so that as readers they better identify a writer's decision-making? |
| | Teaching students the knowledge and skills needed to write genre-specific text (e.g., narrative, persuasive, informative). | How can I supplement my lessons on Text Structure with opportunities for students to learn strategies for composing genre-specific text? |

The Tier-Three Instructional Planning Tool (T-TIP), T-TIP: Pedagogy- Providing Feedback

| Component | Example Pedagogical Activities | Planning Question |
|---|---|---|
| Provide Opportunities for corrective and elaborative Feedback | **Specific corrections**. Correct student answers by providing immediate and specific feedback.<br>**Informative Corrections**. Provide prompts, hints, or cues to assist the learner in determine of correct answers prompt that lead the student to the correct response.<br>**Error Analysis**. Providing error analysis, such as specifying types of mistakes and reasons of mistakes<br>**Instructive Feedback**. The feedback involves consistently adding supplemental information to students' responses.<br>**Explanatory feedback**. Model and have students practice how to get correct responses, as well as how to avoid errors next time.<br>**Monitoring feedback**. Let students know how they are doing overall, not to specific performances.<br>**Reteach**. Reteach the content or providing additional practice at later time when student responses are incorrect due to limited knowledge.<br>**Establish goals for future performance**. | When are the critical points in my lesson that I should provide corrective and elaborative feedback to students? |

When are the critical points in my lesson that I should provide corrective and elaborative feedback to students? *(Please draft specific details and clarify when and how you will provide extensive feedback on these critical reading).*

# Appendix B

## Observational Tool

Observer: Date: Time: School: Grade:

| Reading Component | | |
|---|---|---|
| | **Text Structure** | (Y/N) |
| | **Writing Instruction** (TS/Pro/FS/Con/Cog) | (Y/N) |
| | **Decoding** | (Y/N) |
| | **Fluency** | (Y/N) |
| | **Prior Knowledge** (World Knowledge) | (Y/N) |
| | **Cognitive Strategy** (1=teacher's instruction on strategies; 2= student use of strategies | (Y/N) |
| | **Vocabulary and Concepts** | (Y/N) |
| | **Motivation** (Intrinsic/ Extrinsic) | (Y/N) |

| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** * please check | **On-going at the end of interval * please check** |
|---|---|---|---|
| 1 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** * please check | **On-going at the end of interval * please check** |
| 2 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** * please check | **On-going at the end of interval * please check** |
| 3 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |

| | | | |
|---|---|---|---|
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** *** please check** | **On-going at the end of interval * please check** |
| 4 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** *** please check** | **On-going at the end of interval * please check** |
| 5 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** *** please check** | **On-going at the end of interval * please check** |
| 6 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** *** please check** | **On-going at the end of interval * please check** |
| 7 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** *** please check** | **On-going at the end of interval * please check** |
| 8 | | Specific correction | |
| | | Informative correction | |

| | | | |
|---|---|---|---|
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** *** please check** | **On-going at the end of interval * please check** |
| 9 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** *** please check** | **On-going at the end of interval * please check** |
| 10 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** *** please check** | **On-going at the end of interval * please check** |
| 11 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback** *** please check** | **On-going at the end of interval * please check** |
| 12 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |

| Min | Tally of C&E Feedback | Types of Specific C&E feedback * please check | On-going at the end of interval * please check |
|---|---|---|---|
| 13 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback * please check** | **On-going at the end of interval * please check** |
| 14 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |
| **Min** | **Tally of C&E Feedback** | **Types of Specific C&E feedback * please check** | **On-going at the end of interval * please check** |
| 15 | | Specific correction | |
| | | Informative correction | |
| | | Error analysis | |
| | | Instructive feedback | |
| | | Explanatory feedback | |
| | | Monitoring Feedback | |
| | | Reteach | |
| | | Establish goals | |

| **Summary Data** | **Total Count** | **# minute recorded** | **Rate** |
|---|---|---|---|
| C&E (Corrective & Elaborative) | | | |
| On-going Feedback | | | |
| **Specific Types** | **How Many Times recorded in observation** | | |
| Specific correction | | | |
| Informative correction | | | |
| Error analysis | | | |
| Instructive feedback | | | |
| Explanatory feedback | | | |
| Monitoring Feedback | | | |
| Reteach | | | |
| Establish goals | | | |

Please circle: IOA Individual rating
If IOA, please report the percentage agreement: _____

# Appendix C

Operational Definitions of Reading Components
Based on the work of Faggella-Luby, Wei, McLearn (in preparation)

| Components | Definition | Examples |
|---|---|---|
| **Reading Components** | | |
| Prior Knowledge | Introducing, building, and/or clarifying necessary background knowledge for understanding the academic task. | A teacher clarifies students' prior knowledge, personal story/examples, pervious reading/learning, life experience, culture differences, expertise, vocabulary and concept instruction (building content, giving definitions, examples, synonymous, and analogies). |
| Vocabulary and Concepts | Providing direct instruction on word meanings, word structure (morphology), and conceptual understanding | Vocabulary interacts meaning and gives contexts. The differences between vocabulary/cognitive strategies: If the teacher teaches how to define words, it is vocabulary; if the teacher scaffolds vocabulary instruction as well as giving students chances to practice it, it is cognitive strategy. Cognitive strategies not simply address the concept or vocabulary, it shows how to use a group of concept/vocabulary. According to Eren (2005), cognitive strategies include activate prior knowledge, such as teacher prompts and students self-prompts, that is, we can check both of cognitive strategies and background knowledge |
| Text Structure | Teaching students to recognize and use the organization of narrative and expository texts to support comprehension and expression. | A teacher directs instruction on the fact and/or the importance of text organization: text structure types, the feature of the text (illustrations, headings, signals, bold words, tables, intended audience, captions, pictures, previewing contents, bios), the orgnizational framework of a text (such as first, then, now-- ), and essential details ( punctuations, quotations). |
| Cognitive Strategies | Instructing techniques that help students develop and independently apply key behaviors and thinking skills that support comprehension. | If the teacher think aloud/rehearsal when and how to appropriately use the strategy. Examples: Cognitive strategy should focus on reading comprehension instead of word study. If it involves summarization, prediction, inference, self-questioning, signaling ( modeled how to use pictures, diagrams, figures, tables, headings, subheadings, preview statements, summary statements and logical connectives), graphic organizer, Mnemonics, peer-mediation (partner reading, paragraph shrinking, predication relay), Reciprocal Teaching (including |

| | | |
|---|---|---|
| | | generating questions, summarizing, clarifying word meanings and confusing text, and predicting the content in subsequent paragraph), it is cognitive strategy. |
| Fluency | Teaching students how to orally read a text with appropriate rate, accuracy, and expression (prosody). | A teacher emphasizes letter-sound correspondence; and/or orally read a text with appropriate speed, stress, pause, intonation, and accuracy. |
| Decoding | Providing instruction on how to segment, blend, and decode multisyllabic words. | A teacher instructs students to recognize unknown words through: breaking multisyllabic words into prefixes, suffixes, affixes, and word origin; segmenting, blending, and decoding multisyllabic words into phonemes; |
| Motivation | Promoting engagement in learning, self-efficacy, and self-determination. | A teacher stimulates students to read through: intrinsic motivation (encouraging self-efficacy and self-determination, providing ample interesting books to choose to read, giving rationales before, during and after reading, setting realistic and appropriate goals); and extrinsic motivation (providing tangible rewards, verbal/ non-verbal praise, verbal encouragement, verbal cues, books, CDs, claps, high five, thump up, or coupons). |
| Writing Instruction | Teaching sentence construction skills, the writing process, and strategies to compose genre-specific text in order to enhance relevant reading abilities. | A teacher delivers instruction on text structure, writing processes (setting goals, planning, drafting, revising, and editing), fundamental writing skills , or cognitive writing strategies. |

## Appendix D
## Operational Definitions of
## Reading Pedagogy- Provide Corrective and Elaborative Feedback

**The operational definitions of corrective and elaborative feedback:**

"Corrective and elaborative Feedback entails categorizing the types of errors that students make and providing them with specific information that is both positive and corrective in nature. It also can include the description of and demonstration of a mini-strategy that may help the student avoid the same types of error in the future" (Ellis et al., 1991).

"The overriding purpose of the elaborative feedback is to (a) have students understand the types of problems they are encountering with tasks; (b) translate the information into a plan to solve the problem, and (c) implement the plan to alter and improve performance " (Ellis et al., 1991).

"A teacher provides corrective and elaborative feedback is to correct student answers and provides error analysis (such as types of error, reasons of making mistakes, modeling how to get correct answers, as well as how to avoid errors next time)" (Swanson, 1999).

**What are types of corrective and elaborative feedback?**

Previous research (i.e., Adrienne, 1997; Ellis et al., 1991; Kline, Schumaker, Deshler, 1990; Konold, Miller, & Konold, 2004; Kulhavy & Stock, 1989) identified types of corrective and elaborative feedback that are available to help facilitate student in learning and reading:

- **Specific corrections**. Correct student answers by providing immediate, and specific feedback. The feedback regarding factual knowledge when answering reading comprehension questions. In this type of feedback, the teacher asks a question, student answers the question, and then the teacher consequates the answer with the immediate and specific corrections, such as "well, we can find the answer from this paragraph,--" (Konold et al., 2004). It also includes telling the student that his/her response is incorrect in positive and supportive method. For example, "well, your answer is quite interesting, but I think there is another way to answer this question."
- **Informative Corrections**. Provide prompts, hints, or cues to assist the learner in determine of correct answers (Nielson, 1990).
- **Error Analysis**. Providing error analysis, such as specifying types of mistakes and reasons of mistakes (Kline et al., 1990).
- **Instructive Feedback**. The feedback involves consistently adding supplemental information to students' responses. For example, expand information related to the instructional topic, generate higher-order thinking questioning based on student responses (expanding), repeat student responses and generate new questions according to student answers until all are answered correctly, present materials that requires the same response, and/or give novel information to supply the correct target response (Konold et al., 2004).

- **Explanatory feedback**. Provide additional explanations, such as why a learner's error response is incorrect or perhaps why a correct response is correct and various types of additional remedial screens that may account to new instruction. Model and have students practice how to get correct responses, as well as how to avoid errors next time. For example, providing feedback for the learning process, how to improve for the next time, and how to answer correctly (Merrill, 1985, 1987; Spock, 1987).
- **Monitoring feedback**. Also known as advisement. Let students know how they are doing overall, not to specific performances (Clariana, 2000).
- **Reteach**. The feedback based on the type of response from students. With this type of feedback, teachers could reteach the content or providing additional practice at later time when student responses are incorrect due to limited knowledge (Konold et al., 2004).
- **Establish goals for future performance**. Guiding students to write/set short-term and long-term goals after practice and corrective and elaborative feedback (Kline et al., 1990).

**How to implement corrective and elaborative feedback?**

The teacher's role in providing feedback also shifts in student reading process. Initially, feedback is totally teacher-directed. The student is explicitly informed what he or she is doing and how to perform more effectively. As student become proficient at the content, teacher gives partial feedback or simply cues the student with the expectation that the student will be able to participate in mediating his or her own learning (Ellis et al., 1991).

**Examples and Non-examples of Corrective and Elaborative Feedback**

| Corrective and Elaborative Feedback | Definition | Examples of Corrective and Elaborative feedback | Non-Examples |
|---|---|---|---|
| Specific Corrections | Correct student answers by providing immediate, and specific feedback. | • Telling the student that his/her response is incorrect in positive and supportive method. Positive statements about the product such as "You remembered to capitalize the first word of the sentence". "Well, your answer is quite interesting, but I think there is another way to answer this question."<br>• The teacher asks a question, student answers the question, and then the teacher consequates the answer with the immediate and specific corrections, such as "well, we can find the answer from this paragraph,--" | • "No, I don't think your answer is correct"<br>• Simply state "yes" or "no" or simply demonstrate "your answer is right/wrong".<br>• "Good job" "No, it is not". |
| Informative Corrections | Provide prompts, hints, or cues to assist the learner in determine of correct answers | • Provide prompts, hints, or cues to assist the learner in determine of correct answers instead of correct student answers directly. For example, "You provide part of the answer. The magic in this sentence reflects farmers' desperation in obtaining food. How about the next sentence? Do they have different attitudes toward Magic?"<br>• Providing suggestions for the learning process or learning strategies. | • Yes/no. correct/incorrect, or silent acknowledgement.<br>• Provide specific corrections only (i.e., give direct corrections with details). |
| Error Analysis | Providing error analysis, such as specifying types of mistakes and reasons of mistakes | • For example, "In each reading, the strategy to help you comprehend the sentence was not identified".<br>• Provide error analysis on reasons of mistakes. For example, "the reason why you did not use any strategy in your reading comprehension is probably because you still have some questions on paraphrasing shrinking strategy".<br>• Grade the completed student product, categorize the errors using an error-analysis procedure, choose and note the categories of errors upon which the feedback would be based, and return the product to the student for correction. | • Focus on specific errors only, instead of types of errors. |

| | | | |
|---|---|---|---|
| Instructive Feedback | The feedback involves consistently adding supplemental information to students' responses. | • Expand information related to the instructional topic by generating higher-order thinking questioning based on student responses (expanding). Repeat student responses and generate new questions according to student answers to extend student understanding of the target content. For example, the teacher asks "what does tranquil mean?" the student responds "calm". The teacher then says "that's correct and the opposite of tranquil is restless." (*The teacher expended the target skill by telling students the opposite of word)*<br>• Present different materials that require the same response. For example, the teacher might hold up a picture and ask a question "what is the name of this animal?" the student answered, and then the teacher then presents the print word *Penguin* to students and says "yes, this is the word penguin".<br>• Give novel information to supply the correct target response. The teacher gives new or unrelated information to students. For example, the teacher asks "what is this strategy". Students answered and then the teacher responds with "that's right. this strategy was developed by the University of Kansas at the Center for Learning Disabilities in 1980". *(The information that the teacher provides is simply as supplemental information)* | • The purpose of feedback is not providing supplemental information, instead, giving direct correction without additional instruction (e.g., "Your answer is incorrect, the correct answer is receive"). |
| Explanatory Feedback | Provide additional explanations, such as why a learner's error response is incorrect or perhaps why a correct response is correct and various types of additional remedial screens that may account to new instruction. | • Responding to student questions with explicit answers. If students have any questions regarding the feedback, give students detailed instruction (i.e., modeling, demonstration, and practice).<br>• Models the correct procedures and thought processes involved in.<br>• Model and have students practice how to get correct responses. For example, "Since this paragraph is long and hard to understand, I will use paragraph shrinking strategy to summarize the main idea of the paragraph to only 10 words so that it is much easier for me to remember and understand the content".<br>• Demonstrate how to avoid particular types of errors next time. | • Respond to student questions with brief answers. For example, "yes, the paragraph shrinking strategy is appropriate in this paragraph." |

| | | | |
|---|---|---|---|
| Monitoring Feedback | Let students know how they are doing overall, not to specific performances | • For example, "In general, you did a good job on fluency of reading, especially, your abilities in reading at appropriate pace and prosody has been improved"). | • If any specific feedback is provided, instead of overall performance (e.g., In this sentence in which there was a compound verb, the second verb was not identified"). |
| Reteach | With this type of feedback, teachers could reteach the content or providing additional practice at later time when student responses are incorrect due to limited knowledge | • For example, "Well, I think your obstacles in choosing appropriate strategies to comprehend the text is because your struggling in SMaRTTS strategy and paragraph shrinking strategy. Now, let me reteach you the differences between these two strategies". | • Only check if students have any questions, instead of reteach when students demonstrated lack of sufficient knowledge or confusion in the targeted content (e.g., ok, anyone has questions? If not, let's move on"). |
| Establish goals for future performance | Guiding students to write/set short-term and long-term goals after practice and corrective and elaborative feedback | • After all the targeted errors had been covered, the teacher summarizes the content of the feedback (e.g., reviewing the error categories).<br>• The teacher prompted the student to make a summary statement about what he/she had learned.<br>• Make a statement of high expectation for the next trail (e.g., I know you can reach mastery next time if you focus on avoiding these errors).<br>• Form a statement into a written goal to be reviewed before and after attempting the next trail. For example, "Your last reading fluency was 86% accuracy. Mastery of 95% accuracy. How close to mastery do you think you can get on the next practice? please write down your goal of performance". | • Stop the feedback instruction immediately (e.g., ok. Let's stop here. Let's move on to the second paragraph). |

# Appendix E

## Fidelity Checklist

| Activities | Evaluation Criteria | Personnel | Occurred Y/N |
|---|---|---|---|
| Conduct literature review regarding critical teaching behaviors and RTI. | Articles coded for quality using article coding rubric based on *Journal Article Reporting Standards* (APA, 2009) | Wei | |
| Finish the review of literature and develop research questions and methodology for tier 3 observations. | • Study design will be deemed valid if it (a) relates to adolescent ELA teaching, (b) utilizes RTI model, and (c) utilizes robust data analysis methods.<br>• The questions and methodology for the study is discussed and determined during research meeting. | Wei | |
| Prepare a reliable and valid observational tool for understanding the classroom practice. | • The observational tool should be selected including the following evidence-based six foci: a) Reading Content, b) Reading Pedagogy<br>• Operational definition for each category is developed to evaluate the behavior coding. | Lombardi<br>Wei | |
| Design a survey to identify the attitudes, plans, and actions among teachers. | • The content of the survey should be addressed two major domains: the instructional beliefs and instructional actions toward T-TIP prompt.<br>• The survey will be evaluated by team members, experts, and teachers for the feasibility. Revise any confusion if necessary. | Lombardi<br>Wei | |
| Prepare all materials and resources for observational study. | • The material checklist is utilized to record any materials or resources in details. | Wei | |
| Obtain IRB from University of Connecticut. | • The IRB approval should be obtained from the University of Connecticut before research starts.<br>• Any new recruitment or any changes of the study should be reported to IRB. | Lombardi<br>Wei | |
| Identify secondary schools that utilize Tier Three intervention in reading. | • The information and a list of potential schools with tier 3 literacy instruction should be obtained.<br>• Take the priority to schools that have the connections with CBER (Center for Behavioral Educational Research). | Wei | |
| Recruit teachers and obtain consent for participation. | • Consent forms are signed by teachers and returned to project staff before project begins | Lombardi<br>Wei | |
| Recruit, hire and train student workers to facilitate observation and to obtain inter-rater reliability. | • One student worker will sign a letter-of-hire and finish their training on CITI Human Subjects and email back their certifications.<br>• The list of training is checked at weekly meeting, including the training of the project, the training of the reliability, and the training of the assessment administration.<br>• Complete the training until observers demonstrate 90% of inter-rater reliability | Wei<br>Data collector | |
| Pre-data collection | • Observers will be trained on data collection procedures of frequency.<br>• Observers will be trained to master the operational definitions for each category of reading comprehension components, teaching pedagogy, and student engagement.<br>• Observers will practice data collection and calculate inter-rater reliability by using the observation tool with publically available and previous recorded video.<br>• Observers will continue practice until they achieve 90 percent agreement for each category. | Wei<br>Data Collector | |
| Collect data on baseline | • Collect teachers' lesson plans before observation<br>• Audio record reading instruction and teaching behaviors without any PD provided.<br>• Audio record three or five times per week per teacher<br>• Monitor audio recordings and teaching behaviors in a daily basis<br>• Coding materials include: research-designed observational tool, count-down timer, pen/pencil, and clipboard. | Wei<br>Data Collector | |

| | | | |
|---|---|---|---|
| | • For participant 1, the baseline observation should at least collect 4 data points and until the performance is stable.<br>• the observation of each participant and the start of the intervention will be varied. | | |
| Collect data on intervention | • Provide the training to participating teachers at different time period.<br>• The training will be individualized about 60 minutes.<br>• Describe the planning tool and purpose of the tool.<br>• On initial training, provide scenario and graphic organizer with steps of T-TIP<br>• Initial training, teacher and the trainer will review the pervious lesson plan and jointly resolve any barriers to practicing the intervention.<br>• Demonstrate/model the use of the tool.<br>• Provide guided practice of the T-TIP steps and implementing the tool in controlled contexts.<br>• Practice implementing the tool as lesson plan self-evaluation.<br>• Complete the training and solicit the teachers' commitment to long-term implementation of the tool in instructional planning and evaluation.<br>• Decoding of teaching behaviors at Tier Three is conducted by two trained observers in 6-8 weeks.<br>• The coding data is entered weekly to the project laptop.<br>• Missing data will be identified and re-entered into the database.<br>• Collect T-IP planning prompt and self-rating questionnaire from teachers on a daily basis. | Wei<br>Data Collector | |
| Collect data on maintenance | • Maintenance will assess at least twice per month following the completion of the intervention.<br>• The teachers will be encouraged to continue using the T-TIP planning tool as identical to the intervention phase.<br>• The maintenance phase will take place approximately one month after the completion of the intervention.<br>• Teachers will complete the Satisfaction Survey after instruction phase. | Wei<br>Data Collectors | |
| Calculate the inter-rater reliability. | • Enter the inter-and intra-reliability of the direct observation of each teacher into the project laptop.<br>• Content validity is assessed by three outside reading experts blind to the study using a Likert scale measure of content validity for each variable in the direct observation coding scheme.<br>• Concurrent and predictive validity will be analyzed for teaching behavior by correlating observed teaching behaviors and the Direct Behavior Rating, and performing a discriminant function analysis. | Wei<br>Data collectors | |
| Analyze the survey results. | • Measure construct is evaluated by outside experts using the Likert scale measure of the content validity for each category in the survey.<br>• Descriptive results will be used to evaluate the extent to which teaching attitudes predicts teaching behaviors at the tier 3 level. | Wei<br>Brandi Lombardi | |
| Analyze the teaching behaviors and the relationship between student achievements and their typical teaching instructions. | • Outliers identified by box and whisker plots. All points $\geqslant$ 3 standard deviations above or below mean will be deemed outliers.<br>• Effect sizes is reported based on the standards of What Works Clearinghouse (WWC) in reporting to guide the data analysis process, including testing for attrition, baseline equivalence, and intervention outcomes.<br>• Research questions have been answered and supported by quantitative results. | Wei<br>Brandi Lombardi | |
| Submit findings to peer-reviewed journals and conferences. | • Presentation materials created and conference presentation completed.<br>• Research paper is submitted to Journals. | Research Teams | |
| Disseminate the findings electronically. | • Inform the participating schools and teachers the posted results and recommendations. | Research Teams | |

## Appendix F

Fidelity Self-rating Questionnaire
Based on the work of Rickards-Schlichting et al. (2008)

Participant _____ Date: _____
Rater (person completing this form):_____
The goal of this lesson: _____

Please rate the following statement:

1. I used T-TIP prompt in my lesson planning.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| *Strongly disagree* | *Disagree* | *Neither agree nor disagree* | *Agree* | *Strongly agree* |

2. I implemented the reading instruction as designed/planned.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| *Strongly disagree* | *Disagree* | *Neither agree nor disagree* | *Agree* | *Strongly agree* |

3. I delivered the reading components faithfully based on my lesson plan.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| *Strongly disagree* | *Disagree* | *Neither agree nor disagree* | *Agree* | *Strongly agree* |

4. I implemented the following reading pedagogy as planned in this lesson.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| *Strongly disagree* | *Disagree* | *Neither agree nor disagree* | *Agree* | *Strongly agree* |

Provide Opportunities for corrective and elaborative feedback _____

5. Overall rating of my instruction with the planning prompt today.

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| *Strongly unsatisfied* | *Unsatisfied* | *Neither satisfied nor unsatisfied* | *Satisfied* | *Strongly satisfied* |

## Appendix G

The Satisfaction with Instruction Survey
Based on the work of Vasquez III & Slocum (2012)

Please rate the following statements:
**1 – Very dissatisfied; 2 - Dissatisfied; 3 - Not Sure; 4 – Satisfied; 5 - Very Satisfied**

Is T-TIP prompt a way to plan the lesson and deliver the supplemental reading instruction?
1 2 3 4 5

Was the progress of lesson planning shown and explained?
1 2 3 4 5

How helpful was T-TIP prompt with regard to the students' understandings of the content in T-TIP lesson planning? 1 2 3 4 5

Was it easy to set up the T-TIP lesson planning? 1 2 3 4 5

How effective was it with the tool in instructional planning? 1 2 3 4 5

What is your overall satisfaction of the tool? 1 2 3 4 5

Did your feel your students enjoy reading instruction? 1 2 3 4 5

Did you see improvement in student engagement? 1 2 3 4 5

Did you see improvement in your teaching pedagogy? 1 2 3 4 5

Were the changes noticeable in the classrooms? 1 2 3 4 5

Are you satisfied with the training on the planning tool? 1 2 3 4 5

Will you continue using T-TIP in your class in the future? 1 2 3 4 5

Would you recommend this planning tool to other teachers in the future?
1 2 3 4 5

Do you have additional comments on the training or the planning tool itself?

Thank you for your participation. We appreciate your feedback.

## Appendix H

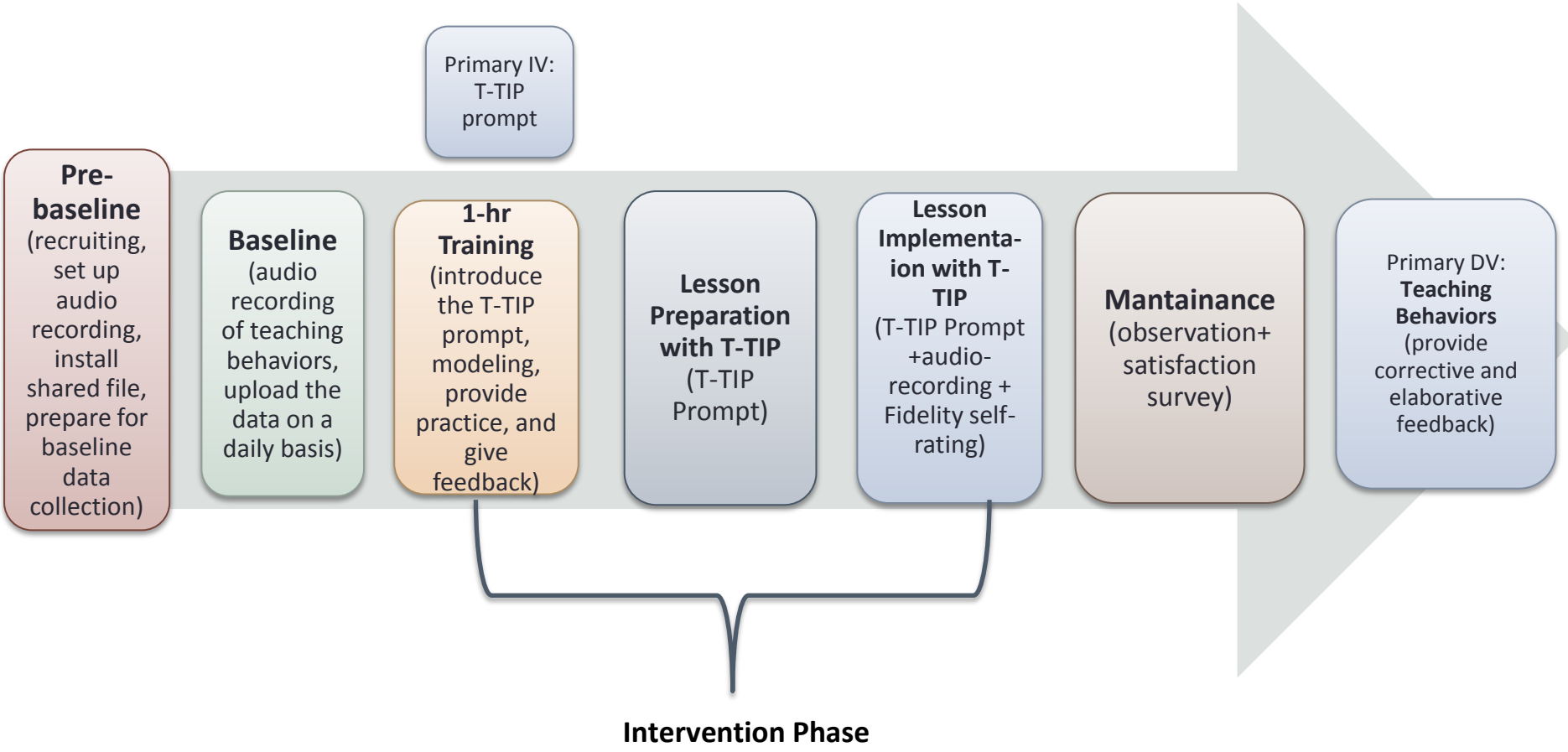
Participants Recruiting Procedures

| | | |
|---|---|---|
| Identify secondary schools that possess tier 3 intervention in reading. | • Speak with districts and schools affiliated with the Center for Behavioral Education and Research's (CBER) research collaborative at semi-annual meetings to confirm potential research sites.<br>• Determine schools adopting tier 3 interventions through communicating with school principals or district superintendents. | |
| Recruit teachers and obtain consent for participation. | • Design an Information flyer and email it to school principals for participation.<br>• Visit school principals in person to explain the purposes, obligations, benefits, and potential risks of the study.<br>• Bring consent form to teachers and require their written permissions if they agree to participate. | |
| Recruit, hire, and train student workers to facilitate observation and to obtain inter-rater reliability. | • Recruit student workers by posting the online advertisement to GRADS_ANNOUNCEMENTS-L @listserve.uconn.edu detailing the obligations and qualifications for the study.<br>• Review the online applications, interview qualified applicants, and hire one most qualified student worker.<br>• Request student workers to take the training on CITI Human Subjects and email back their certifications.<br>• Provide 2-hr training on week 1 and introduce the general information on the proposed study, including the purpose, the methodology of the study, the observational tool, the operational definitions of each category, and the planed schedule for observation. Provide 2-hr training on week 2, as well as preview some videos for understanding and mastering the observational tool and the corresponding operational definitions.<br>• Practice using the observational tool with written scenarios, publically available and previously recorded videos of teachers not involved in the study to get satisfied inter-rater reliability.<br>• Practice data collection by using the observational tool in two local middle/high school tier 3 classrooms. Continue practice until the inter-rater reliability | |

| | | |
|---|---|---|
| | between observers is up to 90%. Then the data collection will be scheduled.<br>• During the observation' data-collection period, additional training will be provided once a week to aid, clarify, or revise, ambiguous operational definitions of the teaching behaviors to facilitate coding.<br>• Revise IRB and include student workers in the study. | |
| Implement observation at schools | • Conduct coding of audio recordings by two trained observers: one observer will serve as the primary data collector and the other as the inter-rater agreement data collectors.<br>• Code the entire period of reading instruction in tier 3 using the observational tool.<br>• Bring the observational sheet, a clipboard, pen, and a digital timer that automatically count down 1-min indicating the starting time of recording when the timer reaches 0.<br>• Collect data in real-time using observational tool (beginning when teacher starting teaching, and ending when the teacher stops instruction (approximately 15-50 minutes).<br>• Prepare the survey questions and then send it out to special education teachers by the end of the Intervention phase. | |

## Appendix I

Procedures



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